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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR 1983

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HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

SECOND SESSION

SUBCOMMITTEE ON THE DEPARTMENT OF DEFENSE

JOSEPH P. ADDABBO, New York, *Chairman*

BILL CHAPPELL, Florida
JOHN P. MURTHA, Pennsylvania
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PART 8

PROCUREMENT POLICIES AND PRACTICES

Printed for the use of the Committee on Appropriations

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR 1983

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PART 8

PROCUREMENT POLICIES AND PRACTICES

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE
98-138 O WASHINGTON : 1982

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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR 1983

WEDNESDAY, JUNE 16, 1982.

PROCUREMENT POLICIES AND PRACTICES

WITNESSES

WILLIAM A. LONG, DEPUTY UNDER SECRETARY, ACQUISITION MANAGEMENT, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

HARVEY J. GORDON, ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

DUARD H. LITTLE, DEPUTY ASSISTANT SECRETARY OF THE ARMY, ACQUISITION, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

THOMAS R. MILLER, ASSISTANT DIRECTOR FOR PROCUREMENT, WEAPONS SYSTEMS DIRECTORATE, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, DEPARTMENT OF THE ARMY

MAJ. GEN. ROBERT L. HERRIFORD, USA, DIRECTOR FOR PROCUREMENT PRODUCTION, HEADQUARTERS, U.S. ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND

EVERETT PYATT, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE NAVY, SHIPBUILDING AND LOGISTICS

MAJ. GEN. JOSEPH H. CONNOLLY, USAF, DIRECTOR OF CONTRACTING AND MANUFACTURING POLICY, DEPARTMENT OF THE AIR FORCE

INTRODUCTION

Mr. ADDABBO. The committee will come to order.

Today the committee will review the procurement policies and practices of the Department of Defense.

This hearing is both timely and appropriate because the procurement budget has increased dramatically in recent years.

From an appropriation of $35.5 billion in fiscal year 1980, the procurement budget now before the committee totals $89.5 billion, a 152 percent increase in just three years.

These sums represent significant monetary investments. This massive increase has resulted in additional interest, not only from the Administration, but from Congress in an effort to assure that the taxpayer is receiving the maximum return on his investment.

BACKGROUND OF INVESTIGATION

Concern about procurement policies and practices is not new to this committee. As long ago as 1956/57, the committee held extensive hearings on this subject, and as recently as 1980, further hearings were held and a detailed review of these hearings was included in the committee report.

The purpose of this hearing is to discuss both the Department's procurement policies themselves and also how they are actually implemented. We want to determine if these policies are being followed in actual practice.

On April 30, 1981, Deputy Secretary Carlucci issued 32 procurement policy initiatives. These initiatives were widely acclaimed as a major effort to streamline the procurement process and make it more efficient. We have some questions about the wisdom of some of these policies, and seek to know how effective they might be.

The General Accounting Office has been of great assistance to the committee in reviewing procurement policies and practices as well as the procurement decisions made by DOD on specific weapons systems.

However, it has been our experience that the suggestions and recommendations of the GAO are either ignored for the most part by DOD or, to say the least, seem to have little impact on the procurement process.

On February 22, 1982, our staff submitted a number of questions on procurement policies and practices to be answered at the OSD level. These questions were received from GAO and were based on recent reports and pending draft reports relating to procurement, contracting, logistics, and maintenance.

By and large the answers received from OSD on March 19th were disappointing in that they displayed an apparent general lack of concern about the problems in question.

We shall review some of these OSD answers during the course of this hearing.

REPORTS BY THE SURVEYS AND INVESTIGATIONS STAFF

In February 1981, the Committee's Surveys and Investigations staff was requested to conduct a major continuing investigation of the procurement practices of the Department of Defense.

The Chairman and ranking minority members of this subcommittee and full Appropriations Committee sponsored this effort. The committee has received three major reports under this directive, and numerous special and supplementary reports.

Together they represent a substantial effort and a comprehensive review. These reports have just been compiled into a single document which includes summaries and responses from the Department.

Without objection, this compilation will be made a part of the record of this hearing.

[The reports follow:]

[CLERK'S NOTE.—This material is an unclassified compilation of the reports and investigative memoranda prepared by the Investi-

gative Staff on the procurement practices of the Department of Defense. Since a good deal of the material was of a classified nature, sometimes the full extent of the shortcomings of the procurement practices of the Department of Defense could not be revealed in the unclassified document.]

A COMPILATION OF REPORTS FOR

THE COMMITTEE ON APPROPRIATIONS

U.S. HOUSE OF REPRESENTATIVES

on the

PROCUREMENT PRACTICES OF THE DEPARTMENT OF DEFENSE

Surveys and Investigations Staff

June 1982

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June 11, 1982

MEMORANDUM FOR THE CHAIRMAN

Re: Procurement Practices of the
Department of Defense

In February 1981, the Committee requested the Surveys and Investigations Staff to conduct a major continuing investigation of the Procurement Practices of the Department of Defense. This document is a compilation of all reports and investigative memoranda submitted to the Committee on this topic between the dates of March 17, 1981, and May 18, 1982. Also set forth, when they were available, are DOD responses to specific Investigative Staff findings.

The material contained herein is unclassified and may be freely used in the conduct of hearings or other open proceedings should the Committee so desire.

Respectfully submitted,

C. R. Anderson
Chief of the Surveys and
Investigations Staff
House Appropriations Committee

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I. INTRODUCTION

By directive dated February 2, 1981, the Committee requested the Investigations Staff to conduct a major investigation into the procurement practices of the Department of Defense (DOD) and all components thereof. The study was to include not only major investment items funded in the DOD procurement appropriation but also consumables funded in the operations and maintenance appropriation, as well as DOD conformance to announced procurement policies.

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II. TRENDS AND ANALYSES

In September 1981, the Investigations Staff submitted a major report on the procurement practices of the Department of Defense. An integral part of this report was a section setting forth the results of a Trend Analysis made by the Staff. This analysis was based upon observations and information obtained during 7 months of investigation of the DOD procurement process.

In replying to this report, the Secretary of Defense assured the Chairman that achieving substantial improvement in the acquisition process is a top priority of the current Administration. He stated that many of the issues discussed in the report had already been recognized as problem areas and are integral and key elements of the DOD Acquisition Improvement Program. In this connection, Defense has identified 32 major initiatives, such as increased program stability and emphasis on competition, as the basis for needed improvements.

The Secretary also enclosed for the Chairman a copy of the Deputy Secretary's statement to the Senate Government Affairs Committee of October 27, 1981, which highlights the progress in improving the DOD acquisition process. A relevant excerpt from that statement follows.

> "On March 2, 1981, we directed a 30-day assessment of the Defense Acquisition System with the priority objectives of reducing cost, making the acquisition process more efficient, increasing the stability of programs, and decreasing the acquisition time for military hardware. The final conclusions reached by our assessment team were not new but had been made by numerous observers of the DOD acquisition process, including many members of the Congress and the GAO. We did, however, pull them together in a comprehensive way. These are some of the principal problems we identified:
>
> "- We try to do too much at one time by looking for quantum jumps in capability, which is excessively costly
>
> "- Early cost, schedule, and performance estimates are overly optimistic
>
> "- Readiness considerations are secondary to hardware procurement and deployment
>
> "- Too many systems compete for scarce resources--we fail to fund the higher priority systems fully

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"- Too much paperwork and too many regulations in the process

"- Too many reviews of technical issues by OSD and Congress (micro-management)

"- Instability caused by starts, stops, stretchouts, redirections and inordinately long decision times

"- The process discourages capital formation and investment

"Our conclusions were reinforced in a major study on DOD procurement released just last week by the House Appropriations Committee. In forwarding the study, the Chairman and other key members of that Committee summarized the problems that the Surveys and Investigations Staff had found. They sound very much to me like a replay of what we found."

In the intervening 8 months since September 1981, the Investigative Staff has continued its efforts in this area. While it is agreed concrete and constructive steps have been taken by DOD toward resolution of specific problems previously identified, it is believed the conclusions reached as a result of the September trend analysis are as valid today as they were when they were written. This trend analysis, accompanied by specific DOD rebuttals and where appropriate Surveys and Investigations Staff informational comments follows:

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Report of September 23, 1981

ANALYSIS OF TRENDS

The near-term prospects for controlling the size of the Defense budget are not promising when faced with the challenge of improving DOD's capabilities to fight the various types of wars that are presented in current threat assessments. To meet these real and perceived threats will require ever-increasing quantities of new military hardware, supplies, and, possibly, personnel augmentation of the armed forces. All of this will mean increased Defense spending at all levels. Unfortunately, the DOD procurement process in place today is ill-equipped to handle the ongoing, let alone the additional defense needs in the most expeditious, efficient, or economical way as highlighted in this report in example after example.

The shortcomings in DOD procurement policies and management practices have fostered waste and extravagance in the acquisition of many major end items. It is an unusual, if not a rare occurrence, when a Defense contract is competed, production quantities and delivery schedules are met, and cost growth is either controlled or minimized. In short, a dismal picture emerges from the extensive evaluation made of many DOD procurement actions.

The condition is worsened by the seemingly insatiable appetite of the military services for more complicated, sophisticated, and therefore costly, weapon systems. Moreover, an increasing percentage of the total Defense budget will be spent on manpower costs, that is, salary increases, inflation, special pay, retirement, and inducements to recruit and hold personnel in the services.

The Investigative Staff believes strong measures will be needed to reverse existing trends that have and are playing havoc with Defense procurement dollars. To obtain more "bang for the buck," the Secretary of Defense will have to reorient the entire DOD procurement process by:

(1) accepting full responsibility and taking an active leadership role;

(2) emphasizing to the military services that the obligation and expenditure of procurement funds will be carefully scrutinized to assure that only proven and needed weapon systems will be procured;

(3) limiting the number of sole-source procurements to the absolute minimum and then only when no other means are available; true competition should be the key--properly implemented, it can cure many of the ailments currently plaguing the procurement process;

(4) working diligently with industry and labor to ensure better quality, productivity, and more timely deliveries;

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(5) focusing attention on policies, regulations, and procedures which may need to be reviewed, revised, or eliminated because they have hindered or been detrimental to overall procurement objectives; and

(6) soliciting the cooperation of the citizenry, the Congress, and industry to root out waste and extravagance wherever it exists.

The stakes in this effort are high--the adequate defense of our Nation in a period of serious unrest around the world and the challenges presented by the many differing demands on the limited resources available.

RESPONSE

As indicated in the covering letter, we have implemented an acquisition improvement program with 32 separate initiatives. We believe this program will meet the objectives noted in the report.

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Report of September 23, 1981

RESEARCH AND DEVELOPMENT--
AN END UNTO ITSELF

The Department of Defense supports between one-fourth and one-third of all scientists and engineers in the United States. About $10 billion each year is spent on defense-related research and development (R&D). The R&D fraternity has evolved from a role supportive of DOD policymakers into an "end unto itself" which demands its "share" of the Defense budget. They strongly believe that R&D expenditures should always be a certain percent of the annual DOD procurement program. This attitude is most critical since the United States rightly or wrongly bases its overall defense posture on the viability of "technological superiority," i.e., quality will persevere over quantity. Such a philosophy necessarily makes R&D the central focus for DOD and its industrial counterparts, both in the development and procurement process.

For military reasons, perceived or real, much of the technology being explored by the R&D community is on the leading edge and as a consequence is in a constant state of flux as new ideas are developed and old ones discarded. Such an iterative process results, for example, in the construction of a combat ship requiring 35,000 design changes and 6,000 change orders so that every possible "Buck Rogers gadget," as it is developed, can be included. The Government tends to pay for all R&D work on a cost reimbursement basis, because of the higher technical risk and the large expenditures required. Firms which take part in this work do so practically risk free. DOD makes this defense R&D arrangement even more attractive by allowing the firms to retain patent rights for any potential civilian work that may ensue.

The full-scale development cost of individual weapon systems has been growing significantly in the post-Vietnam era. There have, however, been fewer new systems developed and less technological innovations other than that which oftentimes appears to be change for change sake. There are some significant trends in the R&D community which are driving these costs ever higher.

-- The development time has lengthened for each succeeding generation of weapons systems. For example, the POLARIS A-1 took 5 years, the POLARIS A-3 took 6 years, the POSEIDON C-3 took 9 years, and the TRIDENT C-4 will take about 11 years!

-- The large expenditures on engineering of complete weapons systems (especially in full-scale development) result in substantially less money going to the critical advancement of new components and materials.

-- There has been a clear shift of R&D funding from the small inventor-led companies to large firms. The latter firms are the only ones now capable, financially and

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otherwise, of the massive efforts associated with full-scale development of large weapons systems, but they certainly are not the only source of new inventions or necessarily the best.

-- The R&D emphasis on the extremes of equipment performance has escalated dramatically the cost of military equipment and, thus, greatly reduced the quantities or mix of equipment which can be procured. By contrast, in the civilian world, R&D is used to simultaneously reduce cost and improve performance.

A major objective of DOD's acquisition process appears to be the encouragement of arbitrarily low-cost estimates in order to get R&D programs through the approval and budget process. The accepted practice of "buying in" not only limits the competition to large firms (who are making a profit on current production programs to afford the risk (low), and are looking for a sole-source opportunity in the production follow-on), but the practice also encourages these firms to make significant design changes during the R&D program. These changes increase the cost and stretch out the development schedule, thus enabling the contractor to recover his "buying in" costs and solidify his sole-source position.

In spite of the magnitude of the DOD's R&D programs, there appears to be no adequate tool to measure effectiveness. Money is spent and results are accepted, whether or not they meet a quantified strategic or tactical combat need.

Each service has its own particular and often duplicative R&D program. Thus, for example, if the Army R&D program results in a design of a "green suit" laser, the Air Force R&D program will also result in developing a "blue suit" laser to demonstrate its level of competence. This prevalent practice appears to be a military iteration of the old, "not invented here and therefore it's no good" syndrome.

RESPONSE

The weapon system acquisition cycle has lengthened. This is an acknowledged problem the DOD has been working to correct through streamlining the front end of the cycle and combining or even omitting subsequent phases when such actions are compatible with technical risk and military urgency. However, to compare the POLARIS program with POSEIDON or TRIDENT may give a distorted picture since POLARIS was really a crash program to produce the

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first of a kind in weapon system and close a gap in our capabilities. POSEIDON and TRIDENT were not accorded the same relative priority. Effective with the FY 1983 budget process, the actions to approve the military requirement and to initiate funding of the conceptual effort have been combined under the PPBS process. The military departments have proposed these new starts in their POM's (Program Objective Memoranda), and the OSD and Joint Chiefs of Staff have then proceeded to review descriptions and justifications for each one concurrent with conducting the budget review. This latter effort had been previously conducted as a separate action using a documented and protracted coordination cycle called the MENS process.

In time, our defense systems have grown ever more complex. This has exacerbated the need for design changes not only for the components themselves, but for the compounded problems of integration so that the subsystems and support systems can effectively play together. We are not exploring and incorporating the leading edge of technology for technology's sake but to try to maintain the qualitative edge we still hold many areas as a counter to the Soviets' quantitative superiority. They have closed our technology advantages in many instances. In addition, aggregations of design changes such as 35,000 in the construction of a combat ship, should not be interpreted to indicate that all these changes were made because of a desire to include the latest advances in military hardware. This aggregate number would cover all changes made, including those which correct typographical errors, amplify design details, or otherwise make minor modifications to the numerous drawings which do not change the design of a ship. Some contractors have at times insisted that even minor changes would have to be documented in change orders. A GAO Report (PSAD 80-18 of January 10, 1980) found that Navy management of formal changes in shipbuilding contracts is satisfactory.

A number of steps have been taken to improve our cost picture. We have intensified efforts to improve long range planning and projections of costs by mission area during the periods of the FYDP (Five-Year Defense Plan) and EPA (Extended Planning Annex). We also work to improve specific program cost estimates, both for acquisition and operations and support. We have introduced means for flexibility and reserve in these estimates and try to make them realistic in regard to technological risk.

A major acquisition improvement initiative now being implemented concerns Pre-Planned Product Improvement (P31), a technique for orderly, time-phased introduction of technology and subsystem augmentation to meet a similarly expanding threat. We believe this more deliberate approach can accommodate more accurate overall costing by deferring higher risk efforts that can also await finer definition of the military requirement.

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Report of September 23, 1981

THE DOD PROCUREMENT PROCESS
NEEDS TOTAL REEVALUATION

Congressional intent and enacted legislation make it abundantly clear that competitive procurement is the desired method of procurement. But only about 11 percent of DOD's procurement dollars are spent under the competitive procurement method. DOD's adherence to a noncompetitive philosophy is driving procurement costs relentlessly upward and concurrently causing a serious reduction of an already limited industrial base.

There are a number of reasons for this predicament.

First, a DOD procurement officer is primarily interested in receiving a product, on time, with as few problems as possible. While important, the cost of a product is not one of his major concerns. Competition for a product could take more time and result in the selection of a contractor who might not perform as well as another contractor, who is a known performer although more costly.

Second, the process of procuring goods and services for DOD has become increasingly complex. The Commission on Government Procurement identified over 4,000 statutes which govern the procurement process. In addition, there has been a dramatic growth in the number and scope of Government socioeconomic objectives which are being incorporated into the procurement process.

Third, over the past 10 years, the DOD procurement budget has increased substantially while the DOD procurement establishment has remained relatively stable. As a result, opportunities to save hundreds of millions of procurement dollars have been lost by inability to implement such proven techniques as "component breakout" and the "leader/follower concepts." These mechanisms have been and can be effectively used to break sole-source procurements and avoid the pyramiding of costs which arise when DOD relies on prime contractors to manage the related subcontracts.

Fourth, there is great emphasis and pressure in DOD to procure and produce major end items and very little importance assigned to the essential follow-on, logistical support programs for these end items.

The indications are that the development of major weapons systems is taking longer and is becoming more expensive. As a result, fewer programs can be put into full development. The industrial impact of this will be more oligopoly competition and increased "buying in" of a steadily decreasing number of programs. Probably a large number of smaller innovative firms will be driven out of the defense market either through bankruptcy or by moving into more attractive business opportunities.

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RESPONSE

In FY 1980, 36 percent of DOD procurement were awarded as the result of price or technical and design competition. For the first 6 months of FY 1981, 45 percent of DOD procurements were awarded as the result of price or technical and design competition. Additionally, in FY 1980, 21 percent of DOD procurements were follow-on awards to sources initially established as the result of competition, e.g., F-15 aircraft, F-16 aircraft, and M-1 tank. The comparable percentage of follow-on awards for the first 6 months of FY 1981 was also 21 percent.

The Deputy Secretary of Defense has established increasing competition as one of the initiatives to improve the acquisition process. He has requested the military departments as defense agencies having procurement authority to establish management objectives for the enhancement of competition. DOD firmly believes in competition and will seek competition wherever practicable.

The report's contention that we are adhering to a noncompetitive philosophy is not accurate. We are actively pursuing ways to obtain the benefits of effective competition. We seek competition wherever practicable and feasible. In FY 1981, 40.7 percent of the dollar value of procurement transactions were awarded on a competitive basis (price and design/technical). Another 23.6 percent were awarded as follow-on contracts, to sources initially selected as a result of competition. An additional 3.4 percent were awarded based on catalog or market prices where the market place has established the prices.

One of our acquisition improvement initiatives is to enhance competition. The military departments and defense agencies have been directed to (1) designate individuals at each procuring activity as advocates for competition, (2) establish goals for increasing competition in all buying organizations, (3) insure that each commander understands his responsibility for maximum feasible competition, (4) make competition in systems development and production a matter of special emphasis, and (5) develop procedures for identifying and publicizing significant achievements in competing contractual requirements.

Most of our sources for major weapon systems result from up-front competitive selection in the design and development phase. We are endeavoring to carry competition through full-scale engineering development, or as far as practicable, and into production through second sourcing at the prime and subsystem level. Procurement techniques used to obtain the benefits of

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competition in the procurement of major systems and equipment are described in our comments on Volume II, Contracting and Procurement.

We believe, however, that there are situations where competition is not practicable or feasible. Surveys and Investigations Staff comments throughout the report suggest that competition is a panacea, while glossing over or dismissing out of hand very real concerns integral to the decision to compete. These include problems with equipment integration and configuration management, increased acquisition lead time, and the cost of implementing competitive techniques which may exceed savings potential. It is a proper management function to intelligently assess the facts and determine appropriate procurement strategies.

As previously noted, a significant amount of our procurements are follow-on contracts principally for major systems. It is impracticable, in most cases, to recompete follow-on quantities of major systems. Nevertheless, the Department intends to increase competitive contract awards. The Deputy Secretary of Defense has placed increased competition high on the list of initiatives to improve the acquisition process.

COMMENT

The Surveys and Investigations Staff persists in the contention that DOD is adhering to a noncompetitive philosophy. While senior managers at the Secretarial level may espouse competition as the "way to go," at the working level a different attitude exists. A number of senior military and civilian personnel at procuring activities stated that competitive procurement only causes problems. Specifically, it can result in late delivery of an unsatisfactory product. The biggest area where DOD can expand competitive procurement is in the component breakout program. Time and again, the Investigative Staff has found numerous opportunities for DOD to compete the procurement of weapon system components at great savings to the Government. The normal cause for not identifying component breakout opportunities are (1) lack of knowledge, (2) lack of technical data, and (3) lack of effort to do the extra work.

The DOD response downplays the advantages of competitive procurement, yet the use of sole-source procurement technique has two serious disadvantages: (1) a much greater cost to the Government and (2) a serious erosion of the industrial base.

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Report of September 23, 1981

LOGISTICS--DEFENSE'S ACHILLES HEEL

The DOD has placed most of its priorities and funds in areas of R&D and the procurement of weapons systems. The logistical support for those weapons systems on-line or coming into the inventory has been sorely neglected for many years. It has been correctly said that, "logistics isn't sexy," thus it receives very little attention.

This segment of DOD's readiness posture, while woefully underfunded, does receive more than its share of "management systems." DOD employs legions of accountants and computer programmers to track funds passed between and among various DOD activities. The complexity of the systems created by these accountants and computer programmers boggles the mind. Stock funds (at least 20 separate systems), numerous industrial funds, vast systems of property accountability, and control have turned combat commanders into "clerks" who read and respond to voluminous products produced by the accountants and programmers. In spite of this effort, the Investigative Staff found that the 82nd Airborne Division, the Army's premier combat outfit, frequently failed to submit requisitions for material they needed (material which was readily available at Army depots) due to the fact that they did not have sufficient Army O&M funds to procure the item from the Army stock fund!

In the early 1970's, the Army dismantled many of its major depots in overseas theaters and replaced this capability with direct support systems from logistical facilities in the United States. These actions probably saved some logistical expenses as intended, but they undoubtedly had a serious effect on the already precarious state of DOD's readiness.

Each military service has its own supply capability, supplemented by the Defense Logistics Agency and the General Services Administration. Duplication, overlapping, and even waste abounds in this area, and attempts by OSD to make improvements in supply management and reduce costs have met with great resistance on the part of the military services. As a consequence, the DOD is saddled with myriad inefficient and costly supply systems.

It appears that there will be continuing pressure to increase the Defense budget--from industry (which is trying to increase its share of defense business even more) and from the military services which are threatened by the rising costs of military equipment due to its excessive complexity and sophistication, and the need to obtain additional weaponry to counteract the perceived increasing strength of Soviet military forces.

The current Administration is likely to respond to these pressures by approving higher Defense spending, but the Investigave Staff believes this additional spending will not necessarily

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lead to a significantly improved defense posture or a strengthening of the defense industrial base unless major structural changes take place in the DOD procurement process. This report of the Investigative Staff presents a comprehensive overview of many of the recognized deficiencies which are adversely affecting critical defense needs, and it deals specifically with some of the remedies.

RESPONSE

It is undeniably true that for many years military logistics accounts were slighted in favor of funding for R&D and procurement of weapons systems. Traditionally, there has been a strong lobby within the Pentagon, on Capitol Hill, and in industry for more force structure and modernization, but a relatively weak lobby for the logistics required to enhance near-term readiness. Over the past several years, however, there has been a growing realization, within both DOD and the Congress, of the importance of the logistics accounts in terms of maintaining adequate levels of peacetime readiness. The President's fiscal 1981 supplemental request, submitted to the Congress soon after he assumed office, included more than $500 million for additional Air Force spare parts purchases, including $34 million specifically for the F-15. The President's fiscal 1982 budget amendment added almost $600 million more--an amount designed to cover fully our best available current estimate of peacetime Air Force aircraft spares needs, and to provide badly needed increases in our wartime surge capability. The fiscal 1983-1987 Defense Guidance to the Military Departments for preparing their programs, accords the highest possible priority to force and weapons system readiness. The Administration is committed to a strong military achieved via the proper balance among force structure, modernization, readiness, and sustainability.

The report states that logistics support for those weapon systems on-line or coming into the inventory has been sorely neglected for many years. This problem has been recognized for many years, but the Department has been slow in effectively dealing with it. Previous administrations have put into place systems, such as the one requiring preparation of Integrated Logistics Support Plans, that have not worked adequately because they have not been properly enforced. It is our objective to make logistics management systems work.

The basic theme of the introductory logistics portion of the report is correct in that for many years DOD has placed its priorities and funding on R&D and procurement of weapon systems while logistics and support systems were given less attention and

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funding. Budget requests for the past 2 years have corrected this situation. The FY 1983 budget request continues to emphasize readiness, logistics support, and sustainability. We have accorded a high priority to redressing inherited deficiencies in material readiness and sustainability.

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III. SUMMARY OF ISSUES

On March 17, 1981, the initial report on this directive in the form of a Briefing Summary was submitted to the Chairman. A second report was submitted on September 23, 1981. This report consisted of an Overview and Summary as well as four substantive volumes. Supplements to this second report were issued on October 23 and updates on two issues previously reported on were made on October 7 and October 27, 1981. A memorandum on an individual issue followed on December 29, 1981.

The third major reporting segment on the procurement practices of the Department of Defense was presented to the Chairman on February 17, 1982, in the form of a Summary and two major volumes. Since that date, eight additional memoranda have been submitted to the Chairman, on topics within the purview of the directive. Three were updates of issues previously reported on and five involved new issues.

A summary of all issues reported on to the Chairman from March 17, 1981, to May 18, 1982, follows.

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-- A BMO study of the cost impact of SALT provisions in the MX system identified cost savings that could be achieved without adversely affecting verification confidence.

-- Unrealistic MX missile transporter requirements increase the number and complexity of transporters and result in higher weapon system costs.

-- An extra fuze system was being developed for the MX missile at the direction of the Secretary of Defense. The Strategic Air Command believes the current fuzing options are more than adequate for the MX.

-- Due to the pressure to obligate funds prior to year end, more than $100 million of the funds obligated for FY 1980 development tasks were in excess of MX contractor requirements for the year and were not expended for that year's effort.

-- Unnecessary duplication exists in Precision Guided Munitions (PGM) development. Neither the Office of the Secretary of Defense, nor the Services, know how much unnecessary effort is being undertaken. PGM effectiveness is degraded because of survivability issues of designators and launch platforms, and because of communication difficulties between designators and launch platforms.

-- By direction the Navy established a requirement for the Army HELLFIRE laser guided missile before determining if the missile was compatible with other shipboard equipment.

-- TOW missiles cannot be removed from ships' magazines and loaded aboard Marine attack helicopters while aboard Navy ships.

-- Deficiencies in the methodology and the input used by the Navy in its Nonnuclear THREAT Model may result in inaccurate requirements and unnecessary procurements.

-- The Navy's current requirements for the MARK-46 and MARK-48 torpedos seem to be substantially overstated in relation to need.

-- The Navy is regularly using tactical S-3A antisubmarine warfare aircraft to perform logistics missions for deployed naval battle groups.

-- The Marine Corps, as part of the purchase of AV-8A aircraft from a British firm, acquired Aden guns and ammunition which cannot be used aboard U.S. Navy ships. This problem cannot be solved until a replacement gun is installed on the AV-8's.

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-- The AV-8B aircraft Program is experiencing severe cost growth, and its mission is a subject of controversy in DOD.

-- The F/A-18 aircraft does not meet original performance specifications established by the Navy in several specific areas.

-- The Army has lost at least $8.3 million as a consequence of the procurement of defective MUST equipment.

-- The Army has persisted in funding the development and production of an electronic artillery time fuze contrary to user requirements.

-- The Government is operating two long distance telephone systems, and two Federal agencies are providing local telephone service in metropolitan areas.

-- There are indications of possible underutilization of the DOD Satellite Communications System.

-- Navigational Positioning Systems presently in use and being developed by the Federal Government may be duplicative, expensive to operate and maintain, and provide less than optimum services.

-- The Navy has proposed reactivating the aircraft carrier, ORISKANY, and four IOWA Class battleships. The Navy cost estimates are tentative and are at best, only plus or minus 40 percent preliminary approximations. A realistic assessment of the total cost cannot be made until the configurations of the ships are determined. Further, there is considerable doubt as to whether sufficient industrial capability exists to do all scheduled work in the time frame proposed.

-- The Army has negotiated a sole-source contract with a foreign manufacturer for the procurement of the Ten Ton M.A.N. Truck which will require contractor support and maintenance for its entire 20-year life span.

-- OSD's proposed consolidation of the management of consumable items has the potential for annual savings in direct costs of between $73 million and $124 million.

-- The Army has made little progress in resolving retail inventory management problems and opportunities still exist for savings of $126 million.

-- Serious and pervasive problems relating to contracting for professional services have existed at least for the past 20 years.

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-- The concept of full funding and advanced procurement is being eroded and abused as a result of DOD's procurement of goods and services that do not meet Congressional criteria. The effect is to increase sunk costs prior to full funding authorization and tending to commit future Congresses to the program.

-- Operational reliance on contractor personnel for engineering and technical services has reached the point that Navy air wings, and to some extent the Tactical Air Command do not have the capability to operate at full combat mission readiness without civilian contractual support.

-- The Navy is allowing shipbuilders to purchase commerical insurance coverage previously excluded which is inconsistent with the general and historical Government policy of being a self-insurer.

-- The Navy awarded a cost reimbursement contract, the most undesirable method of contracting, to meet the demands of a contractor even though established DOD procurement practice and Navy policy calls for a fixed price incentive type of contract.

-- The Navy was not able to provide adequate design specifications for ship construction resulting in added expense caused by change orders to a contract.

-- The Navy is over paying overhead costs because its shipbuilding contracts provide for escalation payments on costs not subject to inflation pressures.

-- The Navy could reduce the number of spare aircraft engines carried by aircraft carriers not scheduled to be committed in the first 30 days of conflict. An estimated $24 million could be saved by reducing the quantity of F-14 spare engines.

-- The Navy could substantially reduce inventory investments in supply support of submarines by changing the existing criterion that has led to excess supplies of items on submarines and submarine tenders.

-- Savings in excess of $62 million could be realized by more effective use of spare parts that are available in the military department supply systems.

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-- The ABRAMS M1 tank still has design deficiencies and fails to meet several requirements pertinent to maintainability and supportability, and actual production continues to lag far behind previously planned and funded delivery schedules. The Army FY 1982 M1 program request can be reduced by approximately $400-450 million without adverse effect.

-- A premature decision to type-classify and produce the Infantry/Cavalry Fighting Vehicles (IFV/CFV) has resulted in a concern that the vehicles to be produced may not effectively meet requirements. Production problems and changes in tests required to assess doctrine, tactics, vulnerability, and supportability have delayed planned achievement of an initial operating capability by more than 1 year and will probably result in costly design changes and additional program delays. Revised Army production and delivery schedules indicate that the FY 1982 IFV/CFV program request can probably be reduced by approximately $400 million without adverse affect.

-- The Navy's decision to remove the automated propulsion control system from the LHA class amphibious assault ships was premature, should not have been made, and has cost an extra $30 million. A similar project involving the removal of waste heat boilers from DD-963 class ships has been recommended by the Senior Navy Steering Board over the objections of in-house engineering personnel and, if implemented, could cost an additional $1 billion.

-- The Army plans to spend $553 million in FY 1982 to procure and operate the ROLAND air defense missile system even though existing systems are available which provide equal or better defense at much less cost. Based on its limited mission role, its high cost, and duplicative nature, further funding of this system does not appear to be justified.

-- Development of the PARTIOT air defense missile system continues to progress under constrained conditions pending the results of DOD directed tests. The PATRIOT force included in Army's air defense plan does not meet all of the Army's D-day requirement, and recent studies show this need can be met by a number of options. If the PATRIOT is chosen as the option, production costs can be reduced and delivery can be expedited by increasing the number of units produced each year. Moreover, the need for $40 million in contingent liability funds requested in the FY 1982 amended budget for this system is questionable.

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-- System deficiencies in the Army Attack Helicopter AH-64's Target Acquisition Display System makes the total weapon system capability questionable. A procurement decision should be delayed until these deficiencies are resolved.

-- A cost-effective alternative that could provide a potential savings of about $1.2 to $1.7 billion is available to the Air Force in its effort to reengine the KC-135 aerial tanker fleet.

-- The concept of a Rapid Deployment Joint Task Force has evolved from a force of light divisions capable of rapid response to contingencies throughout the world, to a very costly, unified command for Southwest Asia. Program costs are currently estimated at $17 billion but will likely be higher. There is no approved operational plan in existence as yet for the RDJTF, and joint planning has been marred by interservice rivlary and infighting. The primary constraining factor on the RDJTJF's potential for success is transportation, especially the woefully inadequate airlift. Planning for the Maritime Prepositioning Ships program as well as sealift support, in general, in many instances appears to consist of ill-conceived, urgency driven, stop-gap measures that either do not fulfill requirements or are contrary to them. Duplicative and potentially costly communications planning shortfalls are also in evidence.

Procurement of some RDJTF scenario dependent requirements should be held in abeyance until the need is specifically identified through an approved operational plan. Savings realized from elimination of ill-conceived sealift support programs alone (some of which the Navy now also questions) could total $779.5 million. An additional $520-615 million savings would accrue by elimination of certain communications projects that cannot be justified based on REDCOM/RDJTF communications requirements.

-- Military spending in preparation for chemical warfare has been limited in recent years to protective equipment. Some items procured, such as antidotes and protective shelters, appear as a frivolous response to a genuine Soviet threat. The planned FY 1982 procurement of modifications to warning devices presently in the U.S. inventory at a cost of $67 million appears as another ill-conceived, stop-gap effort. A less expensive modification kit is available that would serve adequately until more desireable equipment is developed and which would result in an initial procurement savings of approximately $57.8 million.

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-- DOD's Foreign Military Sales (FMS) Program is competing with commercial sales of the same item. To the detriment of U.S. business, foreign governments are purchasing commercial items through FMS at lower costs.

-- The Small Business Act's implementation is reducing competition, increasing cost, and lengthening procurement leadtime, resulting in costly production delays. Additionally, the Small Business Administration has issued certificates of competency to small business firms with records of poor or nonperformance.

-- The Service Contract Act (SCA) forces DOD to pay higher labor rates than necessary in the performance of service contracts and forces contractors in lower cost-of-living areas to pay higher wages and fringe benefits than those prevailing in the contractor's area.

-- Budgeting constraints and the expense of procuring technical data from contractors, plus a reluctance on the part of procurement officials to do so, have deterred DOD's component breakout program and hindered competitive procurement.

-- The Leader/Follower procurement technique can lead to an increase of competitive procurement and result in savings of hundreds of millions of procurement dollars. The Army's Missile Command used this technique to good effect in the procurement of only three weapons systems and achieved estimated savings exceeding $171 million.

-- Pursuit of an aggressive component breakout program can result in substantial savings in the purchase of spare parts by the military services. One major contractor charged DOD 630 percent more for spare parts than it would cost if these spares had been procured directly from the component manufacturer.

-- Contractors' pyramiding of prices for components and parts is costing DOD millions of dollars annually. Pyramiding appears to have become an accepted way of doing business for many contractors, and cost increases to DOD over the initial suppliers' actual price of 300 to 600 percent are not uncommon.

-- Higher prices are paid for DOD procured items because of erroneous or improper procurement method coding, inadequate or nonexistent technical specification data, and restrictive procurement specifications. The net effect of these procurement practices is an increase in sole-source and/or noncompetitive contract awards.

-- The military services are paying significantly different and sometimes higher prices to procure the same items.

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-- Defense contractors continue to attempt to pass unallowable overhead costs on the DOD. DCAA audits have revealed numerous overhead abuses by Defense contractors.

-- The cost-effectiveness of the Cost Accounting Standards (CAS) cannot be determined. Multiple contract actions and unauthorized use of funds can occur under CAS implementation. DOD contracting officers have, in many cases, a negative attitude towards CAS.

-- The Naval Sea System Command (NAVSEA) continues to practice unsound contracting policies in applying economic price adjustment clauses to overhead. This failure was emphasized to NAVSEA early in this study. NAVSEA's response has failed to reflect an understanding of this deficiency, and they continue doing business in the same old way--compounding the problem. NAVSEA stands alone among DOD agencies in its handling of economic price adjustment clauses.

-- Year end spending does not appear to be a major problem, however, there are pressures to obligate funds at year-end that occasionally lead to the award of unfavorable contracts or to procurement of low priority items.

-- The program for acquiring commercial products in lieu of Government specification items has progressed slowly, and achievements so far have been very limited. The program for relying on commercial rather than Government distribution systems has made virtually no progress, and there are serious concerns as to whether the cost to implement the program, as it is currently conceived, is justified.

-- Problems exist in contracting for engineering, maintenance, technical, and logistic support services because of continuous reliance on contractors rather than DOD personnel. Collectively, the problems and their causes increase overall costs and foster sole source procurement.

-- It is apparent that neither DOD nor the military services are congizant of the number of persons or costs involved in contractor supplied technical services or the total effect such services have on the present state of readiness.

-- Postprovisioning reviews are not being conducted as required by the military services. As a consequence, cannibalization has become a way of life for service maintenance programs due to a shortage of spare parts.

-- Processes for material obligation validation are inadequate, ineffective, and time-consuming. Requisitions for material no longer required have not been cancelled and, conversely, valid requisitions have been erroneously cancelled--seriously delaying the receipt of needed supplies by combat units.

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-- Military services objections to the challenging of requisitions for nonstandard and nonstock items are weak. The implementation of a strong workable challenge procedure could result in savings of about $141 million annually.

-- If stock funds are intended to provide a buyer seller method of financing the cost of purchasing consumables, the inclusion of management costs is necessary; however, if stock funds are only a convenient method for financing the cost of consumable items, then the inclusion of these costs will only complicate the process.

-- DOD emphasis is needed for stock fund management improvement. Each military service and DLA has developed its own concepts and methods of operating stock funds.

-- The transfer of consumable items from the military services to the Defense Logistics Agency could result in savings of $200-300 million. Objections by military services are parochial and sometimes emotional.

-- Procedures used to account for DOD property in the logistic pipeline are confusing and contradictory.

-- Poor inventory control at various DOD supply activities continues to require billions of dollars in inventory adjustments.

-- Tens of millions of dollars of inventory losses are due to inadequate supply processes, losses in transit, and theft.

-- Hundreds of millions of dollars of special tooling are being stored at contractors' plants, with costs to DOD of millions of dollars annually.

-- Numerous audits have pointed out DOD's deficiencies in the handling of Government furnished material (GFM). Dollar value of GFM in contractors' hands cannot be easily identified. DOD and the military services have been slow to react to GFM controls.

-- Failure of DOD to have about $290 million worth of industrial plant equipment ready for immediate use can result in additional contract costs and delays in contract performance in case of a national emergency.

-- Management's response to findings reported by the various audit agencies to different levels of DOD indicates that management, in most cases, veiws audit as a positive management tool. However, their commitment to the audit function appears to need strengthening.

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-- The full cost for the B-1 Long Range Combat Aircraft (LRCA) will be considerably more than the "baseline" cost of $19.7 billion estimated by the Air Force. Moreover, it will have less capability than directed by Congress, and the highly concurrent schedule for development and procurement pose significant risks to timely deployment and adequate support.

-- Due to demonstrated past technical problems and schedule delays in the Passive Optical Seeker Technique (POST) phase of the STINGER Program which will prohibit award of a contract for this missile prior to FY 1983, deletion of $31.8 million from the Army's FY 1982 procurement request would not adversely impact the program.

-- Serious questions and specific problems concerning the proposed procurement for the upgrade of the HAMOTS range instrumentation system at Hill Air Force Base, Utah, were identified, i.e., questionable cost data was used and questionable technical evaluations were made, no interface with existing training systems was specified, and the requirement for the upgrade was not as urgent as implied.

-- An overview of the armored vehicle programs within the Army and the Marine Corps revealed that requirements are individually developed based on hardware capabilities and service unique perceived needs rather than on integrated doctrine and tactics for a combined arms force.

-- The Army is rushing into Full Scale Engineering Development of its Army Helicopter Improvement Program through major modification to the OH-58A Scout Helicopter despite the fact that test results have shown a minimum application in the mission roles perceived for the aircraft.

-- Concerns expressed by the Committee in 1980 and again in 1981 on the need to maintain a crucial industrial capability to produce night vision goggles apparently were forestalled by the Army until these same concerns were called to the personal attention of the Secretary of the Army in late 1981, by several members of Congress.

-- An Army assessment of second generation night vision devices revealed that the Army's capability to detect and engage the enemy at night, falls far short of that which should exist.

-- An analysis of peacetime programs suggests that training ammunition consumption is inadequately managed, and not sufficiently documented in procurement budgets.

-- The Navy's LAMPS MK III program has a long history of cost growth, indecisiveness, and overly-optimistic projections. The Navy's management has perpetuated this indecisiveness, making it a major contributing factor to excess program costs. The planned mission profiles for the LAMPS MK III will severely cripple it as an ASW asset.

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-- The Advanced Medium Range Air-to-Air Missile has experienced substantial cost growth, further increases can be expected, there is considerable concurrency between testing and production, and production quantities may be considerably overstated.

-- The effectiveness of Department of Defense contract pricing procedures can be improved.

-- The interpretation of definitions in the Cost Accounting Standards and the Defense Acquisition Regulation are broad enough to result in legal action by contractors to obtain payment for expenses not envisioned by the Government when a contract was signed.

-- Aggressive action to expand the use of competition and limit sole-source contracting can do more to contain the rising cost of Defense supplies and services than any identifiable price negotiation technique.

-- A variety of management weaknesses exist in DOD procurement ranging from (1) failing to consolidate procurement quantities, (2) accepting prices as competitive when the contractor was the only bidder, and (3) willingly paying what is asked without reconciling the price with lower pricing history.

-- DOD has made some progress toward increasing the use of competition, but there appears to be ample room for improvement.

-- The Air Force system for estimating expendable spares needs tends to overstate requirements, resulting in larger than required inventories and increased operating costs.

-- Navy rationale supporting its reasons for second sourcing the AYK-14, that is, competition and establishment of a mobilization base, does not contain sufficient substance to justify the expenditure of the $22 to $35 million required to establish a second source.

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-- The Air Force currently has approximately $25 million worth of excess external nozzle segments, formerly a part of the F100PW100 Engine Augmenter Section of the F-15 aircraft, on hand due to a failure to coordinate the removal of the segments from service on the part of various Air Force commands.

-- Review of 16 of the acquisition items claimed by DOD as Total Obligation Authority (TOA) savings in its February 8, 1982, document entitled, "Economies and Efficiencies, Department of Defense" discloses that of the $2.1 billion claimed, only $152 million were valid TOA reductions and capable of being realized as savings in the fiscal years claimed.

-- Although extensive time and resources were devoted by OSD, the Army, and Air Force to the aborted purchase of the 9mm handgun, the procurement process was reduced to a useless exercise because of "turf battles" on the part of the principals.

-- The requirements for the Light Armored Vehicle (LAV) joint program are currently in a state of flux. The Army and the Marine Corps are proceeding pellmell into concurrent development, testing, and procurement. Moreover, the vehicles to be ultimately procured will be markedly different in important components from those included in the current crash program.

-- Under development for 10 years at a cost of at lest $30 million, the Naval Air Logistics Command Management Information System (NALCOMIS) is expected to take another 8 years and $500 million to complete. Its implementation will be complex and expensive, with life cycle costs approximating $2.5 billion in FY 1981 dollars.

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IV. INDIVIDUAL ISSUES IN REPORT OF MARCH 17, 1981

By directive dated February 2, 1981, the Committee requested an investigation be made into the procurement practices of the Department of Defense and all its major components. The investigation was to include not only major investment items funded in procurement appropriations but also consumables funded in operations and maintenance appropriations, and their conformity to announced policies.

On March 17, 1981, the initial report on this directive was submitted to the Chairman. It consisted of a briefing summary addressing the following items of substance reviewed to date by the Investigations Staff. This section of the report contains a presentation of each issue, how it was used, the DOD response, and Staff comments and disposition, where appropriate.

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Report of March 17, 1981

THE MX ICBM

Issues on the MX include (1) whether the need for viewing ports in the shelters goes beyond what is needed to meet SALT verification requirements, (2) whether the quantity of transporters is realistic, (3) whether an extra fuze system is necessary, and (4) whether funds obligated for FY 1980 development tasks were in excess of MX contractor requirements for the year and were not expanded for that year's-effort.

1. SALT Verification Provisions

In order to meet SALT verification requirements, the currently proposed basing system for the MX includes several features designed to allow monitoring of the number of missile launchers deployed in the system. However, the provision for viewing ports in the protective shelters and the use of cluster barriers go beyond what is considered essential for effective verification. According to officials of the Strategic Air Command, other features of the deployment procedure, such as conducting missile assembly operations as openly as possible and controlled introduction of assembled missiles and launchers into the deployment area, provide sufficient observable activities to assure that the system is fully verifiable by satellite surveillance.

In its original baseline design for MX multiple protective structure basing, the Ballistic Missile Office (BMO) provided for monitoring missile launchers for SALT verification purposes up to the point where the launchers enter valleys in the deployment area, rather than at each of 200 clusters of 23 shelters within the valleys. In compliance with OSD direction to include SALT viewing ports in shelters and to place barriers at each cluster, the baseline was modified to add personnel and equipment required for these provisions, consisting of 701 personnel, 24 barrier removal vehicles, 8 special transportaion vehicles, 30 cover overburden removal/ emplace vehicles, 30 cover removal support vehicles, and 115 mobile generators.

In the opinion of BMO officials, the added SALT requirements constitute "overkill," and do not justify increasing acquisition and operating costs as well as complicating operations and increasing operational risks, particularly in regard to degradation of shelter hardness, increased potential for damage to missile or shelter, as well as security and survivability aspects of having shelters fully open and missile not in hardened shelter during 7-day verification opertion. Similar concerns about duplicative SALT verification provisions in MX basing were noted by the Committee in its report on the 1981 Military Construction Appropriation Bill.

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A BMO study of the cost impact of SALT provisions in the MX system indicates that monitoring launchers within the deployment area costs about $1.1 billion, but does not greatly increase verification confidence. The study also shows that an additional $.5 billion can be saved by using larger clusters (i.e., 4-5 missiles per cluster of 92-115 shelters). The savings were based on reduction in facilities, equipment, and personnel. For example, the number of cluster maintenance facilities can be reduced from 200 to 50. Use of larger clusters to reduce costs was also raised by the Committee in its report.

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In summary, by counting launchers entering or leaving the deployment area, program costs can be reduced $1.1 billion; and by using larger clusters, additional savings of $.5 billion can be realized, with a total reduction of $1.6 billion. These amounts are in FY 1978 constant dollars, exclusive of inflation. In "then year" dollars, the amounts would be about double, or $3.2 billion. (Directive points 2, 3, and 9.)

2. MX Missile Transporter Requirements

The Investigative Staff developed information regarding unrealistic requirements which increase the number and complexity of MX missile transporters and result in higher weapon system costs.

Under the normal plan of operation, the transporters would be used in the initial placement of the missile launcher into 1 of 23 protective shelters in a cluster and, thereafter, would be used only 6 or 7 days out of the year when the missile launcher is moved to another shelter as part of a reshuffle to preserve location uncertainty or to a maintenance facility. In addition, if some concern about location uncertainty develops, or if an international crisis appears to be developing, the transporters would be used in reposturing the missile force, or in placing the force, or a portion of it, in constant motion and getting the missile launcher to the nearest shelter if tactical warning indicates an attack.

Because SALT verification provisions incorporated into the currently proposed MX basing system require barriers at the entrance to each of the 200 missile clusters in the deployment area, and prohibit interconnecting roads between clusters, each of the 200 transporters is restricted to its cluster where it sits idle for most of the year. These conditions prevent efficient utilization of very expensive transporters, which are estimated to cost $8 million each, and result in vehicle requirements far in excess of operational needs.

According to officials of BMO, if cluster barriers were eliminated, or interconnecting roads or 4-missile/92-shelter clusters were used, all the necessary operations could be accomplished with half the number of transporters and still provide sufficient system mobility to be within acceptable risk parameters. The Investigative Staff believes that reexamination of the frequency of missile force redeployment and other mobility requirements could possibly result in reduction of the total number of transporters to 50.

The dash capability, incorporated into the missile transporter requirements to accommodate "hide on warning" procedures associated with force-in-motion and SALT verification operations, increases the complexity of the transporter and raises its unit cost from $6 million to $8 million. However, BMO officials doubt that this

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capability would actually be used. If there were any real danger of attack, it is more likely that the missiles would be left in their hardened shelters rather than take the chance of the missile being caught out in the open on the transporter or at an unhardened maintenance facility.

The Air Force is in the process of reviewing all MX system requirements with the objective of reducing total program costs, which GAO estimates will be about $70 billion. In the opinion of the Investigative Staff, the missile transporter requirements and costs should be revised to a more practical, operationally justifiable level. It should be possible to reduce transporter costs from $1.6 billion (200 transporters costing $8 million each) to $300 million (50 transporters costing $6 million each), with a savings of $1.3 billion. These amounts are in FY 1978 constant dollars, exclusive of inflation. In "then year" dollars, the amounts would be about double, with savings of $2.6 billion in the funding that will be required for procurement of MX missile transporters. Although revised requirements and operations would also result in significant reductions in operating and maintenance costs, the information necessary for determining the amount of savings was not available for analysis by the Investigative Staff. (Directive point 3.)

3. The Path Length Fuze Question

During its study of the obligation and expenditure of funds appropriated for the MX missile program of the Air Force, the Investigative Staff found that an extra fuze system was being developed for the MX missile, notwithstanding the fact that the added capability was not needed.

Although the missile's MARK-12A reentry vehicle already has four different fuze systems available, which provide for a total of 24 fuzing options, the Air Force was directed by the Secretary of Defense to develop another, known as the path length fuze. The development and incorporation of this capability into the MARK-12A is estimated to cost the MX program more than $400 million. However, the Strategic Air Command believes the current MARK-12A fuzing options are more than adequate for the MX.

The driving force behind initiating development of an alternate method was a concern that one of the four fuze systems had a potential for being defeated. However, the enemy's ability to do so reportedly does not currently exist. Further, the fuzing options using this particular system normally combines it with one of the other systems as a backup in the event of failure of the primary system. (Directive point 3.)

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4. Obligation and Expenditure of Unused FY 1980 MX Funding

The Investigative Staff has developed information regarding the obligation and expenditure of funds appropriated for the MX missile program of the Air Force. Due to the pressure to obligate funds prior to the end of the fiscal year, more than $100 million of the funds obligated for FY 1980 development tasks were in excess of MX contractor requirements for the year and were not expended for that year's effort. Instead, the unused funds were left on the contracts and improperly carried over to finance FY 1981 development tasks. BMO took this action without obtaining the forward financing approval required by Air Force financial management policy.

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USE

The above information was provided to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was provided for the record.

RESPONSE

Salt Verification Provisions. It appears as though the SALT verification ports in the Shelter roofs and single missile clustering are not required. Elimination of these features would avoid about $1 billion in acquisition costs and on the order of $15-20 million per year in O&S costs. At this point, however, it is prudent to retain the basic verifiction concept of controlled assembly and introduction of missiles/launchers into the deployment area. This provides foundation upon which we can assure M-X/MPS compatibility with present and future arms control agreements.

M-X Missile Transporter Requirements. By eliminating single missile clustering, it is possible to reduce the number of transporters (perhaps to 100 or so) thus avoiding several hundred million dollars in acquisition costs, but still retaining sufficient flexibility to exploit the mobility features of the horizontal MPS basing mode.

Path Length Fuze. The GAO reported to Congress that our current radar controlled fuzes in present day reentry vehicles (such as thed MK12A)---.

This would also result in a higher probability of damage against hardend targets.

Obligation and Expenditure of Fiscal year 1980 M-X Funding. The M-X development program proceeded at its planned pace during fiscal year 1980. All funds appropriated were obligated as scheduled. Furthermore, contractors committed or expended all fiscal year 1980 funds prior to the start of fiscal year 1981. As is normal, all funds were not expended before the end of the year. We are, however, responsible to obligate, not expend, all appropriated funds. No forward financing occurred.

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Report of March 17, 1981

PRECISION GUIDED MUNITIONS

The Investigative Staff has made extensive inquiry into DOD Precision Guided Munitions Programs and has determined that unnecessary duplication has occurred, and is continuing in Precision Guided Munitions (PGM) development. Neither the Office of the Secretary of Defense, nor the Services, know how much unnecessary effort is being undertaken in developing PGM technology to meet the same, or similar, objectives. For example, in millimeter wave seeker technology development, the Navy has five contracts, the Air Force has four contracts, and the Army has nine contracts, all for millimeter wave seeker technology development. Further, one contractor has an Army contract, a Navy contract, and an Air Force contract, all three contracts for millimeter wave seeker technology, and all are at the identical frequency. Another contractor has five different contracts for millimeter wave seeker projects, two Army, two Navy, and one Air Force, but with some frequency differences.

This problem also exists in developing other missile guidance systems, dispensers, and submunitions. Different weapons for the same targets (such as ASSAULT BREAKER and WAAM) and different radars for similar needs (such as PAVE MOVER and SOTAS) are other areas where dupliction appears to exist.

Survivability issues for PGM ground and airborne designators, as well as PGM launch platforms, have created significant problems in PGM effectiveness.

USE

The above information was provided to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following response was furnished for the record.

RESPONSE

Within the topic, Precision Guided Munitions, the Surveys and Investigations Staff has raised three issues: (1) Unnecessary dupliction in PGM development efforts, (2) Survivability of PGM designators, and (3) Effectiveness of Radio Communications associated with semi-active laser PGMs. These issues will be addressed in order:

(1) UNNECESSARY DUPLICATION IN PGM DEVELOPMENT EFFORTS. The S&I staff has concluded that there exists unnecessary duplication in PGM development efforts and that neither OSD nor the Services know to what extent this is occurring. While there is undoubtably some duplication within PGM developments,

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particularly within technology efforts, one must recognize that some duplication is highly desirable, particularly in the technology efforts and in concept validation. For example, millimeter wave seeker technology development is specifically cited as having extensive unnecessary duplication. In examining this area the S&I staff appears to have grouped seeker development efforts based on radio frequencies between 35 and 140 gigahertz and, because there are more than one project, termed the efforts duplication. The S&I briefing failed to point out that within this group there are two systems in development WASP and SADARM; there is only one tech demo (AIFS); and of the eleven tech base activities, three are joint-Service sponsored and the remaining eight are not over-lapping. Applications span the scope of our weapon systems from cannon-launched projectiles to ballistic missile defense. There are basically six major contractors and several support (measurements and analysis) contractors involved in this technology area. These seemingly duplicative efforts are actually very different approaches to quite different problems. Moreover, in exploratory and advanced development it is sound development philosopy to sponsor several competitive approaches to the same problem so that only the "best" designs are later transitioned to the more costly engineering development programs. Technology base programs are coordinated by OSD through formal coordinating groups like the Joint Service Guidance and Control Committee. There might be cases where unnecessary duplication exists; but efforts are continually being made to eliminate unnecessary or unproductive efforts.

In the area of weapon system duplication, a few additional comments are in order. It is correct that in some cases, different weapons are being developed to attack the same target. Usually this is a result of differing Service operational scenarios. For example, both the Army and the Air Force are tasked with 2nd Echelon armor interdiction. Operational considerations have resulted in two entirely different weapon approaches in the Assault Breaker and the WAAM concepts. It is admitted, however, that there are cases where better Service cooperation and joint development ventures would yield a single weapon instead of two to do basically the same job. There is also a tendency to design weapons to a specific single task resulting in many different weapons. It is these last two areas where additional emphasis will be placed to eliminate unnecessary developments and to identify the minimum required to accomplish the defense mission.---, it is intended to identify the minimum set of key weapon programs required to accomplish the missions, eliminate the others, and properly fund ordnance procurement to meet inventory stockpile requirements.

(2) SURVIVABILITY OF PGM DESIGNATORS. Survivability of airborne designators and delivery platforms is a critical issue in the high density threat environment of Europe. This

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also is particularly true for forward observers who designate targets within 5-10km of the FEBA. It is not clear, that with an initial operating capability in November 1981 for the cannon launched guided projectile, COPPERHEAD that attrition of these resources will be so severe as to render them ineffective.---. For this reason we are developing the Low Level Laser Guided Bomb (LLLGB). The LLLGB will give the pilot the capability to launch the weapon at---. This very modest development program (<$30 M) still maintains cost as critically important with a DTC goal of $8,500 (fiscal year 1979$). Other systems are also being designed and readied for production with careful attention to operational flexibility in the high threat environment. For example, Laser HELLFIRE has been designed with greater range than its predecessor (TOW) and has several launch modes including lock-on-after-launch which can considerably improve operational flexibility. Obviously, there will be some instances where the threat, the weather and other operational conditions preclude the proper use of semi-active laser guided weapons; however, such severe conditions will not occur most of the time.

(3) EFFECTIVENESS OF RADIO COMMUNICATIONS ASSOCIATED WITH SEMI-ACTIVE LASER PGMs. The DOD is working to solve the radio incompatibility problem in the near term by providing forward observers with radios which are directly interoperable with those in the aircraft.

Additionally, the TRI-TAC production program will result in new and improved voice and message communications equipment and networks that are secure and more resistant to the ECM threat. The DOD also has a program to improve our current networks by developing and acquiring a new set of antenna systems to support the existing family of AN/VRC-12 radios. These antenna facilities will have ----.

As a standard practice our fire direction units are also equipped with a substantial wireline laying and retrieval capability to permit continued operations in hostile ECM environments while minimizing the effect of enemy radio frequency direction finding capabilities.

Finally, several of our PGMs have launchers and designators collocated and, thus, no communications are necessary for employment.

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THE HELLFIRE LASER GUIDED MISSILE

The HELLFIRE, a "fire and forget" laser guided missile, was developed by the Army for use in conjunction with the Army's Advanced Attack Helicopter, the AH-64. The Navy took an interest in the missile as a supplement to the TOW missile now installed on the Cobra Helicopter, AH-1J/T and signed a Joint Service Operational Requirement with the Army in 1978. The Navy's interest was in response to direction from the Office of the Secretary of Defense.

Navy officials said that Navy specifications were provided to the Army but the Navy did not have funds available to insure that all Navy specifications were incorporated into the missile. The HELLFIRE is now in a design-freeze status with a production decision scheduled for December 1981. The Navy is now conducting additional testing at the Dahlgren Naval Surface Weapons Center. Until these tests are completed the Navy does not know if the missile will be shipboard compatible nor what corrective measures can be taken to insure shipboard compatibility.

USE

This information was furnished to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply for the record.

RESPONSE

During April and May 1981 Navy will be evaluating Army test data and conducting Navy unique tests on HELLFIRE to determine missile shipboard compatibility. In May 1981 there will be a joint service meeting involving Navy, Army and prime contractor personnel which will examine any issues resulting from Navy testing. An initial report on HELLFIRE shipboard compatibility is scheduled for submission to CNO in June 1981.

Funding requests have been submitted for Navy RDT&E requirements based on a projected fiscal year 1982 and fiscal year 1983 HELLFIRE modification program that would produce a shipbaord compatible missile. Initial Navy procurement funding is scheduled for fiscal year 1984 and first missile delivery in fiscal year 1986.

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THE TOW MISSILE SYSTEM

Information developed indicates that the TOW missile, the U.S. Marine Corps' premier anti-armor weapon which is procured by the U.S. Army Missile Command, is not compatible with other shipboard equipment.

The above situation has existed for several years and the Marine Corps has sought a change but the Army has remained silent on initiating corrective action.

USE

The above information was furnished to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was provided for the record.

RESPONSE

The TOW missile has been determined to be safe for use aboard Navy ships, and in fact, is so employed now. Marine aviation TOW missiles are fitted with the MXU-710/A Radio Frequency Shield. This is a metal impregnated foam rubber plug, designed to shield the missile from Navy shipboard radar radiation hazards.

COMMENT

When this information was received and reported, it was accurate and Marine TOW's were not so equipped. In fact, at the time of the response, summer 1981, this "fix" was in the process of being implemented, and the response should have so stated this fact.

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NAVY NONNUCLEAR THREAT MODEL

The Investigative Staff believes there are serious deficiencies in the methodology used by the Navy in its Nonnuclear THREAT Model. These deficiencies may result in inaccuracies in the requirements generated by use of this model and expenditure of procurement funds for unneeded munitions.

The THREAT model is used to compute requirements for Anti-Submarine Warfare (ASW), Anti-Air Warfare (AAW), and the Anti-Surface Warfare (ASUW) weapons, specifically nonnuclear tactical missile, torpedo, and mine requirements. These weapons are referred to as threat-oriented ordnance, i.e., ordnance which is used against those targets which are limited in number or not easily reconstitued, e.g, submarines, surface ships, and aircraft.

The THREAT Model uses the mathematics of probability to estimate the number of weapons which each Navy platform requires to insure, at a given distribution factor, that it can defeat the enemy threat which it is expected to encounter. The model does not employ gaming or simulation--techniques usually employed in requirement development models--but is rather, a scenario and time independent analytical model.

A high-ranking OSD official advised the Investigative Staff the THREAT model methodology is, in his opinion, rife with speculation and unquantifiable assumptions. Until 2 years ago, the Navy had no documentation to justify model input data, and while they have recently improved, this official is still not sure that many of the requirements being generated on the basis of the model are justified. For example, the Navy currently has no quantifiable data or evidence to support the false contact ratio assumption being used to generate ordnance requirements for antisubmarine warfare. This asumption posits for every "true" submarine target encountered and attacked, four false targets will be encountered and attacked.

According to this official, the Navy also considers every submarine and surface ships in the entire Soviet fleet as fully available for combat at all times. No consideration is given to the number of submarines and surface ships that will be in drydock undergoing extensive repairs, destroyed, or damaged while in port. Moreover, in a short-term war, there will almost assuredly be some combatant vessels that will never put to sea.

Additionally, this official believes the task force concept should affect the confidence level for munitions requirements. If one combatant within a task force engages at a higher level than others, most threat level munitions could be transferred via helicopter or "cross decked" from one combatant to another.

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Supportive of the OSD official's opinion of the THREAT model methodology are the results of a study initiated by OSD's Manpower, Reserve Affairs, and Logistics (MRA&L) in 1980 and chaired by a ranking official of the Institute for Defense Analysis (IDA). The study stated that the Navy's THREAT Model methodology was so bad that it should be scrapped and begun anew.

The Mark-46 and 48 torpedo are two Navy systems impacted by the deficiencies in the THREAT model.

USE

This information was provided to the Secretary of Defense during his presentation of the Department of Defense's FY 1982 Appropriation Hearings. His response for the record follows.

RESPONSE

Criticisms in the Surveys and Investigations report center on inputs to the Navy model, not on the basic methodology. The OSD official who sponsored the study (Chaired by IDA) does not concur with the portion of the study which suggests that the model be discarded.

Navy has spent the past year and is still conducting an extensive review of the model's inputs. The factors for most threat oriented ordnance have been reviewed and validated, with OSD participation (although this does not necessarily infer OSD concurrence; however, OSD has not made any adverse comments to Navy on the review after a year of coordination).

False contact ratios are based on exercise data collected over a twenty year period.

The requirement is to kill all valid enemy targets. Should war continue long enough, all Soviet ships in repair and overhaul status could be put to sea.

Cross-decking is not a feasible solution to the combat requirements problem. The ultimate conclusion of assuming cross-decking is to resort to the "one bullet for each target" philosophy.

COMMENT

The response begs the facts. Whether or not the OSD official who sponsored the study of the model agrees with its conclusions is not germane. Moreover, even if the model methodology should prove to be sound but the input defective, a statement frequently heard with respect to computers would apply, "garbage in, garbage out."

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MARK-46 TORPEDO

While the Soviet submarine force is believed to be decreasing quantitatively toward the year 2000 (from approximately 300 currently to 180 in 2000), it is improving qualitatively, with approximately 80 percent of its submarines being nuclear class by 2000. Intelligence sources advise, the MARK-46 torpedo may have difficulty against Soviet third generation double and titantium hulled submarines.

The Navy recently increased its MARK-46 requirements almost 30 percent in the FY 1983 Program Objective Memorandum (POM). Such an increase may be suspect for the following reasons:

(1) NATO allies have over 50 percent as many MARK-46 torpedoes as the U.S., yet are only allocated a miniscule percentage of the Soviet/Warsaw Pact submarine threat.

(2) The 99 percent "confidence" level utilized by the Navy in computing the Inventory Objective (IO) has been challenged by both the Office of the Secretary of Defense (OSD) and the Defense Audit Service.

(3) Reductions in the CAPTOR mine program recommended by the Investigative Staff, if implemented, could result in 24 percent fewer MARK-46's as this torpedo is the weapon system utilized in CAPTOR.

(4) Increasing the IO by almost 30 percent would result in what is viewed as an inordinate number of MARK-46's being available for each of the threat submarines assigned.

USE

The above information was provided to the Secretary of Defense for comment in his apperance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was furnished for the record.

RESPONSE

Soviet---titanium hulled submarines are a problem which Navy is currently studying. No conclusions have been reached yet.

---, the allied contribution is minimized to account for the possibility of Navy having to take on a larger portion of threat than allies would be expected to engage.

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The 99 percent distribution factor (confidence level), which is used to compute the inventory objective, is based on a quantitative analysis of economic costs versus risk and has been shown to be a cost-effective level. The Office of the Secretary of Defense (OSD) has not refuted this analysis on a quantitative basis. Similarly, CAPTOR requirements computed by Navy have been approved by OSD.

Navy, does not compute requirements on the basis of number of weapons per target. The inventory objective is a function of the weapon probability of kill, false attack ratio, enemy targets, and Navy delivery platforms, all of which interact. Therefore, the resulting figure of --- MK-46's per Soviet submarine is irrelevant.

COMMENT

(1) The Navy is studying the problem of Soviet titanium hulled submarines.

(2) It appears the NATO allies anti-submarine capability has been minimized totally beyond an acceptable degree of validity. Possessing over 50 percent as many MARK-46 torpedoes as the United States, yet only being assigned a miniscule percentage of the submarine threat would appear totally unreasonable.

(3) Based on interview of Navy officials long familiar with the CAPTOR program and analysis of operational test results the Investigative Staff still believes that mining of broad expenses of blue ocean i.e., the Greenland-Iceland-Norweigian (GIN) can not be effectively done.

(4) The Investigative Staff considered replenishment, salvo sizing, maldistribution of ordnance and false targets ratio when concluding that an inventory objective that allowed for an average of 30 MK-46 torpedos per threat submarine appeared excessive. If inventory objective has a correlation to the numbers and type of threat it is to combat then there has to be a positive relationship between MK-46 inventory objectives and the threat.

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MARK-48 TORPEDO

The Navy recently increased its IO for MARK-48 torpedoes in the FY 1983 POM. The increased requirements for MARK-48's are questionable due to the following:

(1) A requirement for a mix of HARPOON, TOMAHAWK, and other oncoming missile systems appears to have not been considered in developing the POM 83 Non-Nuclear Ordnance Requirement (NNOR) loadout for SS/SSN submarines.

(2) In its requirements computation, the Navy appears to exaggerate the threat by utilizing different ground rules for availability of Soviet Naval assets than for the U.S. fleet.

(3) Navy POM 83 NNOR computations indicate U.S. submarines would head for replenishment ports after firing less than percent of their MARK-48 torpedoes. In a total conventional war situation it is difficult to conceive of U.S. warship withdrawing from combat after expending so little of its ordnance.

(4) Two NATO countries already have MARK-48 torpedoes, with another programmed to make a procurement decision regarding MARK-48's, or a NATO made like item by September 1981. Despite these MARK-48 statistics as well as those depicting NATO MARK-46 torpedo capability, the Navy has opted to allocate only a miniscule percentage of the submarine threat to our NATO allies.

USE

The above information was provided to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was furnished for the record.

RESPONSE

Oncoming missile systems such as TOMAHAWK and HARPOON have been considered in computations of MK-48 inventory objectives.

The requirement is kill all valid enemy targets. Should war continue long enough, all Soviet ships in repair and overhaul status could be put to sea.

Replenishment of submarines is not based on withdrawal from patrol merely to replenish. Rather, submarines will

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replenish when their patrol time has expired and they return to port. --- the allied contribution is minimized to account for the possibility of Navy having to take on a larger portion of the threat than allies would be expected to engage.

COMMENT

1. Review of the inventory objectives of TOMAHAWK and HARPOON do not lend credence to the Navy claim that they were considered when increasing the Navy Non-Nuclear Ordnance Requirement of MK-48.

2. The Investigative Staff never challenged the Navy statement that if the war lasted long enough all Soviet ships in repair and overhaul would put to sea. But the same is true of U.S. vessels as well. The inequity in the equation is that the Navy utilized one set of rules in arriving at available Soviet assets--best possible use--while utilizing almost a worst possible case in determining U.S. warship availability.

3. This data was provided by a Navy source totally familiar with Navy NNOR loadout and reload procedures.

4. If the NATO allies can only be counted on for countering a miniscule percent of the threat assigned to torpedoes, it is not in line with their capabilities/responsibilities in air and land areas in a NATO general war situation. It is inconceivable that the U.S. Navy would be saddled with the lion's share of the NATO Navy responsibility in this area.

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CARRIER ONBOARD DELIVERY (COD) AIRCRAFT

The U.S. Navy is regularly using tactical S-3A antisubmarine warfare (Viking) aircraft to perform logistics missions for deployed naval battle groups.

In one situation noted, all of the S-3A ASW aircraft aboard one carrier were used during a 4-month period of 1980 entirely for long-range logistics missions, while the carrier and its escort vessels were deployed in the Indian Ocean. The battle group was thus deprived of its long-range, antisubmarine defense; the air crews did not engage in any ASW training; and the operational readiness of tactical ASW assets was degraded.

Another logistics operation employing the S-3A ASW aircraft is currently in operation on the east coast. It is referred to as the "Viking Express" and has existed for about 2 years. A typical sequence of events is that: a carrier deployed in the South Atlantic calls for unavailable aircraft spare parts. An S-3A, with one or two cargo pods attached, carrying retrograde repairables, departs the carrier and flys to Cecil Field, Jacksonville, Florida, where the air crew is usually changed. The aircraft then is flown to the Naval Air Station, Oceana, Virginia, where the repairable spares are dropped off. The S-3A then returns to Cecil Field where the cargo requested by the carrier is loaded into the pods. The aircraft then proceeds back to the carrier.

In October 1980, one ASW squadron expended 32 percent of its flying hours for the "Viking Express." During an 18-day period in August 1979, 40 percent of the effort of another ASW squadron was devoted to the same mission. One Naval officer expressed the opinion that "this is like using a Cadillac to deliver mail."

USE

The above information was furnished to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. A reply was furnished for the record.

RESPONSE

The Navy has a continuing requirement for aerial supply/resupply of high priority cargo, passengers and mail to deployed Carrier Battle Groups (CBG). The Carrier Onboard Delivery (COD) aircraft is the primary vehicle. Transport of technical representatives for support is but one of many tasks for the COD.

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The Navy's only long ranged COD aircraft is one US-3A which currently supports Indian Ocean operations. This single aircraft is inadequate for providing the long range, high priority support required in the Indian Ocean and it is routinely augmented by the S-3A antisubmarine warfare (ASW) aircraft embarked with the CVBG.

The frequent use of S-3A aircraft for logistic support augmentation has been a function of the relative priority of operational requirements. The flight time devoted to logistic support compromises, to some extent, flight crew proficiency in the primary mission area: ASW. There has been no adverse impact on mission system readiness and related maintenance efforts.

The US-3 conversion of five more non-ASW S-3A aircraft will greatly alleviate the long range COD deficiency now impacting the Indian Ocean.

The Navy plans to procure an improved C-2 aircraft as a follow-on COD because it will meet the normal peacetime and projected wartime requirements at a significantly lower cost than any other alternative. The improved C-2 augmented with a small force of US-3A's and operated in conjuction with CH-53E VOD support will provide the Navy with the most balanced, affordable solution for all projected scenarios.

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THE AV-8A HARRIER VSTOL AIRCRAFT

During a study of Navy Amphibious Force requirements, the Investigative Staff developed information concerning the U.S. Marine Corps' AV-8A Harrier VSTOL aircraft reflecting on improper and inadequate acquisition planning resulting in uneconomical procurement of a weapon system and ammunition.

The AV-8A was purchased "off-the-shelf" from the Hawker Siddley firm of Great Britain. As part of the purchase "package" the Marines acquired 30mm Aden guns and a supply of 30mm ammunition. The 30mm Aden gun utilizes an electric priming system--a World War II innovation now considered obsolete. The original lot of ammunition was also found susceptible to damage (leakage) during storage in tropical temperatures. The Navy has purchased 20,000 hand-made rounds with somewhat safer explosive charges.

The 20,000 rounds are not available for loading aboard the Av-8A's without approval from higher authority and during a recent deployment aboard the USS TARAWA in the Indian Ocean, the embarked AV-8A's operated with empty magazines for their 30mm guns.

In the event a contingency situation arose which dictated use of the AV-8A's in combat situation, the ship would be required to adjust its electronic devices in order to operate the aircraft.

Marine Corps officials advised the Investigative Staff that this problem cannot be solved until a replacement gun is installed on the AV-8's.

USE

The above information was given to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following response for the record.

RESPONSE

The AV-8A was purchased "off-the-shelf" from Hawker Siddley, Limited, of Great Britain. As part of the purchase "package", the U.S. Marine Corps acquire the 30mm Aden gun system and a supply of British 30mm ammunition. Subsequent to delivery, it was determined the 30mm Aden gun system and British ammunition were unsafe aboard U.S. Navy ships by Navy standards. In an effort to eliminate the hazards related to the 30mm British ammunition, action was initiated to

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procure the U.S. Army XM799 30mm round. This round eliminated the hazards related to the explosive and fuze although the radiation hazard (RADHAZ) problem remained unresolved. The Navy expended $1.5 million for development and production of 20,000 rounds of XM799 ammunition. Originally, the number of rounds contracted for was 162,000 at $27.00 per round. However, cost overruns were experienced because of technical problems and subsequent delays during production.

Presently, AV-8A flight operations utilizing 30mm is restricted aboard the USS TARAWA. However, if operational requirements dictate shipboard use of the 30mm gun system, guidance has been issued to safely implement loading and handling 30mm ammunition.

Based on the U.S. Marine Corps gun system study, officials have endorsed the 25mm gun system as the desired replacement choice.

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THE AV-8B AIRCRAFT

The AV-8B aircraft, with its ability to take off and land vertically, is being designed for the Marine Corps, which contends the AV-8B will provide its forces with effective close air support through the end of this century. However, the program is experiencing severe cost growth, and its mission is a subject of controversy in DOD.

The AV-8B Advanced Harrier Aircraft Program started as a prototype development effort in 1976 to create a new model which would perform better than the deployed AV-8A. In 1977 the Secretary Defense decided the F/A-18 Hornet, a conventional takeoff and landing aircraft being produced to replace other Navy and Marine Corps aircraft, would be acquired as the Marine Corps new light attack aircraft unless the AV-8B could be shown as more cost effective alternative.

The Secretary, seeking a fly off or comparative test between the F/A-18 and AV-8B, proposed full-scale development of the AV-8B so an engineering model could be obtained for the test. This would have required about $1.2 billion for development and production before the results of the fly off would be known. GAO opposed this expenditure until a definite need for the AV-8B had been established.

Facing GAO opposition the Secretary withheld much of the FY 1979 development funds and did not request additional funds in the FY 1980 budget. However, Congress appropriated $180 million to permit continued development of the AV-8B. Although this was done with the intent that the AV-8B would achieve an initial operational capability in 1984, delays by DOD during the period of indecision, have forced this capability back 2 years to 1986. Should the AV-8B program proceed, these delays will add almost $1 billion to the total estimated cost.

If an initial operational capability were achieved in 1985, more than $350 million could be saved. Possibly, this can be accomplished if procurement funds are granted in 1981 rather than in 1982 as now planned. Further, at maximum production, DOD plans to acquire only four and one-half AV-8B's each month. As in many other weapon procurements, low production rates are inefficient and stretching programs over many years allow inflation to drive costs further upward.

Controversy over the AV-8B in the DOD continues. Opponents argue that conventional aircraft provide greater speed and carry a greater payload; thus, they are more effective. Proponents argue that the AV-8B will provide more responsive close air support. In the midst of this controversy, the Marine Corps remains convinced that the AV-8B will provide it with the most effective close air support.

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USE

The above information was furnished to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was provided for the record.

RESPONSE

The U.S. Marine Corps tactical aviation requirement to provide fire support for amphibious and ground force power projection operations in a timely and effectively manner is clearly understood within the Department of Defense. The AV-8B VSTOL aircraft provide the flexibility, operational characteristics and rapid response capability to achieve the objections of the Marine Close Air Support Mission.

The AV-8B program has been closely monitored by agencies within the Federal Government and the Department of Defense. The last three audits, two by General Accounting Office and one by Defense Audit Service have not indicated the program suffers from severe cost growth. Previous Department of Defense reluctance to proceed with the AV-8B, if sustained, would have delayed the Initial Opertional Capability (IOC) to at least fiscal year 1986, thus increasing costs by approximately one billion dollars. However, the fiscal year 1982 amended budget, plus past Congressional support have allowed the program to proceed toward a fiscal year 1985 IOC.

The planned production rate of AV-8B aircraft is not the most economical rate. Increased production rates are possible and cost savings would be realized. However, the planned production rate is driven by fiscal constraints.

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F/A-18 AIRCRAFT

On July 28, 1980, the Investigative Staff reported to the Committee on its review of the Navy's F/A-18 fighter program. The cost of this program was estimated at $29.129 billion in March 1980, an increase of $16.254 billion over a December 1975 development estimate of $12.875 billion. The program cost as of December 1980 was estimated at $37.9 billion.

The Investigative Staff's review centered on the impact of increasing aircraft purchase quantities in the near term on the program's economy of scale. While a cost analysis developed there were unit cost reduction advantages to increasing the production quantity from 48 to 72 aircraft in FY 1981 (approximately $3.27 million per aircraft), design flaws in the F/A-18's fuel cells, which would likely require design changes and major retrofit activity, would negate any savings achieved. As a consequence, the Investigative Staff recommended against the FY 1981 production increase.

The F/A-18 does not meet original performance specifications established by the Navy in four areas: (1) fighter escort range, (2) acceleration; (3) roll rate and; (4) aircraft weight.

Range Deficiencies

The range deficiencies of the aircraft must be considered a function of its excessive weight, since increased weight proportionately increases drag and fuel burn rate.

The Navy specifications differ for Lot 1 (Full-Scale Development) and Lot 3 (Pilot Production) aircraft. The Lot 1 specifications include a 5-percent fuel flow degrade factor which takes into account the life span of the engine, since burn rates would normally increase with age. The specified fighter escort range for Lot 1 aircraft (with 5 percent fuel degrade) is nautical miles (NM). The first development aircraft flight tests showed the fighter escort range to be only NM. Subsequent test flight results, even after aerodynamic modifications, were only NM. Test results without the 5-percent fuel flow degrade were NM. The Lot 1 aircraft miss their range specification by NM. Applying the Lot 3 aircraft specification, the development aircraft showed test ranges of NM without aerodynamic modification and 398 NM with modification. This is still NM less than the Navy Lot 3 specification, which is miles.

Acceleration Deficiencies

Tests indicate the F/A-18 does not meet the Navy specification for acceleration from Mach to Mach at

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feet. This specification calls for acceleration between Mach to Mach in seconds. Aircraft tests showed the aircraft accelerating from to Mach in seconds before the incorporation of a drag modification and seconds after modification. The Navy indicated the upper test limit acceleration specification may be reduced to 1.2 Mach, which the aircraft now attains.

Roll Rate Deficiency

Maneuverability of the F/A-18 in its fighter escort role is acceptable in airspeeds under knots. Problems occur in speeds in excess of knots at low altitide. Test results show the aircraft has a slow but acceptable roll rate of to degrees per second in most flight profiles, but at 5,000 feet at speeds of knots plus, the aircraft rolls at degrees per second, which is totally unacceptable. Acceptable roll rates in this area area generally 160 degrees plus per second.

Excessive Weight

The initial contract specification in an empty configuration for the F/A-18 was pounds. McDonnell personnel currently estimate the production aircraft will weigh pounds or over specification. This increase includes pounds attributed to the commonality of the fighter and attack versions of the aircraft; pounds for features to improve reliability and maintainability including design features to achieve the fatigue and fracture criteria; pounds for design decisions made to reduce cost; and pounds for features to provide improvements in safety and survivability. The remaining pounds are attributed to production development.

Weight has a detrimental effect on both range and acceleration. The additional pounds reduces the F/A-18's fighter escort range by NM and in the Mach to Mach acceleration range increases acceleration time by seconds.

While a weight reduction program is being pursued and reductions totaling pounds have been identified, they will not be incorporated until the aircraft is produced.

The Investigative Staff is unable at this juncture to make a definitive statement regarding the operational necessity for the Navy's original performance requirements for the F/A-18 fighter. However, its seeming willingness to lower these requirements to accommodate the actual performance of the current limited production fighter would imply lack of validity.

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USE

The above information was provided to the Secretary of Defense for comment during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following comments were furnished for the record.

RESPONSE

The development estimate for the F/A-18 program was $12.875 billion for 811 aircraft. The current total program estimate is $37.890 billion for 1377 aircraft. Of this increase, inflation accounts for 77 percent; changes in requirements (quantity, configuration, schedule), 18 percent; and constant dollar cost growth, 5 percent. The dollar values are:

	Billions
Inflation:	
OSD allowed	$14.830
Absorbed	4.413
Changes in Requirement	4.445
Cost Growth	1.327
TOTAL	$25.015

Absorbed inflation is the result of differences between the actual and OSD-allowed inflation from mid-1978 through 1980. By using understated inflation indices, increases in program costs appear as cost growth rather than inflation.

Early in the program, the F/A-18 was plagued with excessive number 4 fuel cell leaks. The problems causing these leaks have been identified and the following corrections incorporated in all fiscal year 1980 and subsequent production aircraft: action has been taken to provide a more durable tank; acceptance test procedures have been strengthened; and an additional access panel has been incorporated in the aircraft to facilitate installation. It is noteworthy that no fuel leaks occurred during the recently completed IOT&E; moreover, the absence of number 4 fuel cell leaks since last summer has resulted in the reduction of unscheduled maintenance manhours per flight hour from 7.5 to 3.62, an outstanding accomplishment unparalleled in prior aircraft.

Range has been an issue addressed at virtually every major program review since DSARC II. OPTEVFOR recommended that it be determined whether range, cycle time, and maximum landing weight considerations will limit F/A-18 combat capability in carrier-based interdiction missions. Fighter escort range is within 5 percent of DCP threshold and the attack interdiction range is projected to exceed the DCP threshold. The current fighter escort range for the F/A-18 exceeds that of both the F-4 and F-14 and is considered more than acceptable. The F/A-18 may require a centerline fuel

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tank to meet a 1+45 deck cycle time but this should not impose operational restrictions with the exception of the loss of the centerline station (the Sparrows or FLIR and laser spot tracker are mounted on the nacelles). The increase in maximum landing weight from 30,700 pounds to 32,200 pounds, coupled with the Navy's ongoing weight reduction program, will provide adequate fuel margins and outstanding capability.

As a result of the March 1981 Program Review, the acceleration threshold was revised from 0.8 to 1.6 Mach to 0.8 to 1.2 Mach. This transonic region is considered the most critical for mission performance and survivability. The F/A-18 exceeds the threshold and out-performs all other Navy aircraft in this region.

During flight tests in calendar 1980, low aircraft roll rate was discovered due to greater than predicted wing deflection and aero damping at high dynamic pressures. The corrective action includes increased wing stiffness (adding several layers of graphite fibers), increased aileron area (extending the aileron on the outer wing panel to the wing tip), limited trailing edge flap deflection (8 degrees up and down), and differential leading edge flaps. With these fixes incorporated, roll performance, both steady state and angle of bank in one second, will meet requirements.

Although the F/A-18 is heavier than originally planned, it still meets the DOD-approved threshold. An aggressive weight reduction program has been initiated which will serve to counter normal weight growth in any aircraft.

Report of October 27, 1981

In September 1981, the Surveys and Investigative Staff submitted a major four-volume report concerning Procurement Practices of the Department of Defense. At that time work was still ongoing on the Navy F/A-18 Aircraft Program. This report on the F/A-18 is a supplement to Volume I of the September 1981 report.

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BACKGROUND

By the early 1970's, the cost of the Navy's F-14 program had risen so dramatically that OSD and the Congress directed the Navy to review the feasibility of developing a lightweight, less costly fighter. They recommended the Navy take advantage of the then current Air Force Lightweight Fighter program in which the F-16 and F-17 aircraft were competing in a "fly-off." (The F-16 produced by the General Dynamics Corporation was ultimately selected the "winner" by the Air Force.) Additional recommendations included:

(1) Missionization of the aircraft both for air-to-air and air-to-ground missions, i.e., fighter and attack roles.

(2) Equipping the aircraft with longer range missiles such as the AIM-7 SPARROW.

(3) Consideration for including more sophisticated electronic countermeasures equipment.

In May 1975, OSD advised the Congress that the Navy had completed its evaluation and selected the F-17 (the loser) in the Air

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Force flyoff competition. The McDonnell Douglas/Northrop Model 267A aircraft was then designated the F/A-18, and full-scale development was authorized to begin in FY 1976.

Divided opinions within the Navy characterized the early years of F/A-18 development. According to some high ranking Navy officers, a majority of the opinions were against the airplane until 1977, when the Chief of Naval Operations (CNO) "solidified" the Navy's position by decree to support the program.

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PERFORMANCE

The flight performance of the F/A-18 vies with its high production cost as the major subject of concern for this aircraft's opponents. The intentional multirole (fighter and attack) design of the F/A-18 has penalized the aircraft by a loss of performance in both mission categories as compared to traditional individual designs for pure fighter or attack aircraft.

During the Investigative Staff's review of the F/A-18 in July 1980, it was determined that flight test performance had encountered several major deficiencies. The current status of these deficiencies are addressed below:

A. Weight

Weight gain/loss impacts both the acceleration and range of any aircraft. The Navy has increased the original empty weight specification of the F/A-18.

The increased weight of the F/A-18 has reduced its fighter escort radius, and has increased its time of acceleration.

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The increased weight further impacts several other important flight characteristics. Primary among these characteristics, and most detrimental to its performance, is that extra weight requires more power which in turn uses more fuel. Higher fuel burn rates necessitate the external fuel tanks and probably will require an increase in tanker assist for the F/A-18 aboard the aircraft carriers.

While the maximum design catapult gross weight of the F/A-18 is the aircraft to date has only been flown at approximately How well the aircraft will perform loaded with bombs has yet to be fully tested as the attack configuration tests will not be completed until February 1982. The Investigative Staff was advised that on at least one occasion, an F/A-18 with bombs attached of maneuverability.

Range

The added weight of the F/A-18 has contributed in part to another major shortcoming--range. In almost every range category the F/A-18 is short of its original specifications. Opponents of the aircraft believe these shortcomings to be critical for a fighter/attack aircraft in the Navy inventory.

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The Navy's Decision Coordinating Paper (DCP) for the F/A-18 established a threshold configuration of two SPARROW missiles (AIM-7) and two SIDEWINDER missiles (AIM-9) with no external tanks, and required a 400 nm radius of action. The F/A-18 does not meet this specification. Certain Navy officials vehemently state that a comparison of aircraft, i.e., the F/A-18 versus any aircraft, without external tanks is not an "apples to apples" comparison because the F/A-18 was designed to carry tanks. In view of the original DCP specification for this aircraft, i.e., no external "tanks," one has to question the veracity of the Navy's statement in this instance.

The overall range of the F/A-18 is a significant issue. According to the Navy, the simple addition of a centerline tank allows the aircraft to exceed the DCP threshold by 100 nm. The Navy makes all of its range predictions based upon three of these external tanks. What is not said is that when tanks are added they are carried on a weapons station in lieu of ordnance. With three external tanks, five of the nine available weapons stations cannot be used for loading. Moreover, when bombs are added, the weight is increased and the range is decreased. The Navy subsequently changed the DCP threshold to a more "realistic operational profile," but the radius of action, remains the same.

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The F/A-18 radius of action is approximately when there is strict adherence to the DCP requirement of no external tanks and loaded with four MK-83 bombs. With maximum fuel available with the addition of three external tanks, the radius of action was "projected" at However, a recent effort to demonstrate the 706 nautical mile range fell short by and only was achieved.

At the direction of the Secretary of the Navy, the Naval Air Test Center undertook a "typical" attack profile mission with the F/A-18 on September 23, 1981. This mission was to depart Patuxent River Naval Air Station, Maryland, fly to Pinecastle Range, Florida, conduct an interdiction-type attack strike on that range facility and return to Patuxent River. The manner in which this test was conducted leads the Investigative Staff to question its viability and suggests that either the contractor or the Navy, aware of the aircraft's range deficiencies, attempted to structure it to provide the aircraft with extra advantage. This conclusion is based on the following: (1) the mission was flown by a contractor's employee rather than a Navy test pilot (as directed by the Secretary of the Navy); (2) the F/A-18 was "towed" into takeoff position for engine start on the runway to conserve fuel; (3) the interdiction profile was not conducted and attack was made on the target at "idle" power setting on the aircraft which also conserves fuel; and (4) the approach into Patuxent River was made in the

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"minimum fuel condition." Even though these extraordinary steps were taken to conserve fuel, the radius achieved in this test was only of the Navy's projection of Further, had the mission pilot flown a true interdiction mission in the realistic high-low-low-high profile as directed by SECNAV, the range would have been decreased by at least an additional --to just above

Acceleration

The F/A-18 has failed to meet its specification for the time required to transit from .8 mach to 1.6 mach at 35,000 feet for several reasons, including: (1) added weight, (2) lack of variable inlets to control the intake of air, and (3) lower engine operating temperature limits for reliability of the engine. The actual test experience showed the acceleration rate between to be after a drag modification to the wing. The specification was originally established at for this rate area. (However, in the low-to-medium subsonic speeds, the F/A-18 achieved a higher acceleration rate than was expected.) It does accelerate from .8 mach to 1.4 mach in satisfactory times. The main area of sluggishness exists in the speeds between The Navy could choose one of two alternatives: (1) fix the airplane, or (2) "fix" the specification. To change the inlets and "turn up the wick" on the engines was viewed as

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excessively costly and so this solution was not accepted. The Navy's solution, in the face of having to admit a large acceleration performance gap, was simply to adjust the contractural acceptance level to the where the aircraft performs best.

Roll Rate

Maneuverability of the F/A-18 in its fighter escort role was found to be acceptable at airspeeds under 580 knots. Problems were encountered, however, in the transonic higher speeds at low altitudes. In a 1980 test at and at speeds in excess of the aircraft had a roll rate of which was totally unacceptable. Correction of this malady was time consuming and expensive. The wing was stiffened; the aileron's size was increased; and trailing and leading edge flap modifications were made. As of this writing, the Navy claims that the roll rate is now within "operational requirements." No mention is made of what the rate is, or whether the specification and "operational requirement" are the same. The Navy is now asking the Congress for an additional $35.7 million to pay for this modification.

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Fuel Cell Leaks

While not directly related to performance, fuel cell leaks can ground an otherwise capable combat aircraft and in the F/A-18 the fuel leak problem was so pronounced it was equated to a performance shortfall.

From the outset of testing, the F/A-18 program suffered one of its major embarrassments by experiencing leaks in the aircrafts' fuel cells--particularly the main number 4 cell. As an engineer stated, "you'd think with all our technology we could stop a fuel leak." It apparently is not that simple. The number 4 fuel cell, located approximately in the center of the fuselage, had to be replaced 14 times in the first 1900 hours of testing. Approximately 410 man-hours of skilled labor was required to replace each tank--over 5,700 total man-hours were expended on this task.

According to Navy officials, the main problem was in contractor quality control. The Navy has now acquired a new source for the fuel tanks and expects the problem to be resolved in future production aircraft.

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F/A-18 PROGRAM COSTS

Today, it is difficult to recognize the once relatively modest F/A-18 program envisioned in the early 1970's as an answer to the perceived high-price of the F-14 program. When the Navy F/A-18 program was initiated in FY 1975, the projected program cost was estimated at $12.9 billion for development and acquisition of 800 aircraft over a 15-year period. Since that time there have been various adjustments in program requirements including configuration, schedule, production rates, and quantity changes. In FY 1978, the number of aircraft to be procured was increased by 566 (71 percent) to 1,366, for an added $4.012 billion to the program costs.

The current F/A-18 program cost as depicted in the June 30, 1981, Selected Acquisition Report (SAR) is $35.3 billion. The Navy contends this almost threefold increase in total cost of the program is not a result of "cost growth" but is largely attributed to: (1) increased requirement of 566 aircraft in FY 1978, and (2) higher than anticipated inflation rates. Navy officials advised that 92 percent of the total increase--$20.5 billion out of $22.4 billion--can be accounted for by these two factors, with only $2 billion, or 8 percent, a result of actual cost growth.

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The F/A-18 unit cost has increased from $10.39 million in FY 1975 (then year dollars) for 800 aircraft to $25.63 million in FY 1982 (then year dollars) for 1,366 aircraft. Unit cost of the F/A-18--as in other defense programs, is a function of time and quantity of buy. For example, the FY 1982 programmed procurement of 63 F/A-18's will cost $42.10 million each (in then year dollars).

There is no doubt that the singular most significant factor driving the F/A-18 cost ever upward was, and continues to be, inflation. The inflation factors utilized by OSD and OMB in the computation of total estimated costs for OSD systems are totally unrealistic and have served as a vehicle for DOD to understate long-term program costs to the Congress. In many previous reports, the Investigative Staff has identified this shortcoming. Research of SAR documents relating to the F/A-18 revealed inflation factors computed as low as 4 percent with few higher than 8 percent. Even if the Consumer Price Index (CPI) were utilized as the basis for computation, the OSD/OMB applied inflation factors would still be far below an acceptable standard or experienced inflation rates. Discussion with high-ranking corporate executives within defense industries revealed that inflation rates in industries requiring exotic, scarce materials, such as titanium, gold, etc., virtually dictate a separate inflation factor--well above the CPI, for the aerospace industry. For example, in 1980 alone, titanium rose by an average of 35 percent on the open market.

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Application of more realistic inflation factors in the early stages of the F/A-18 program would have likely caused a more significant challenge to the program resulting in either: (1) a reduced programmed procurement, or (2) deletion of the entire program based on affordability issues. Responsible individuals are now faced with having to ask, "can we really afford it" or perhaps more importantly, "can we afford to scrap it" after expenditure of such large sums?

Opponents of the F/A-18 program--both within and outside Navy and OSD circles--argue convincingly that the F/A-18 program is such a "rock in the road" to Navy aircraft procurement actions that other aircraft procurement programs have to be detoured around it. As the chart on the following page illustrates, the Navy admits that over one-third of the entire Navy aircraft procurement budget for the Program Objective Memorandum (POM) 83 period (1981-1987) is absorbed by the F/A-18 program.

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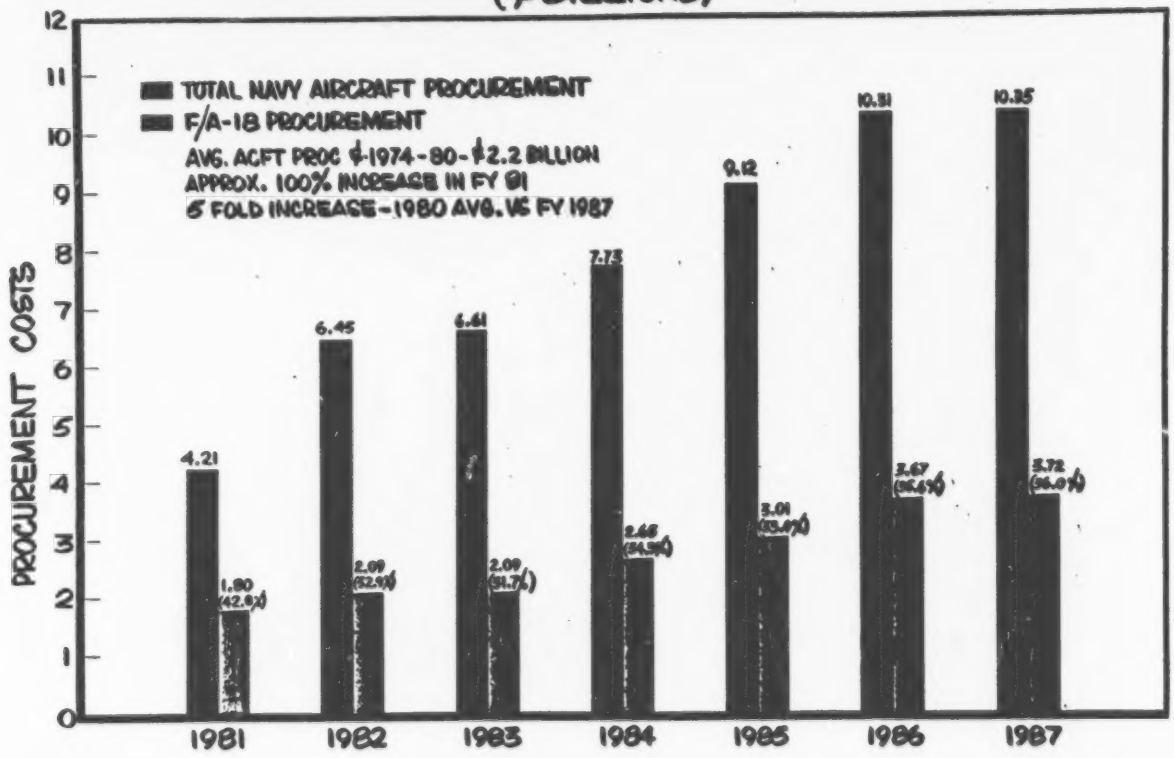
F/A-18 PROCUREMENT COSTS VERSUS TOTAL NAVY AIRCRAFT PROCUREMENT

($ BILLIONS)



Review of Navy aircraft procurement history for the period FY 1974-1980 revealed the Navy averaged only $2.2 billion annually for aircraft procurement during that period, yet is programming almost $11 billion in FY 1987--almost a five-fold increase in a span of only 7 years. Historically, "out-year" POM money projections have not withstood the test of time and have been reduced. The Navy has already adjusted POM 83 overall aircraft procurement downward, but with no corresponding reduction in the F/A-18 program. Reductions were made instead in programs the Investigative Staff feels are vital to Navy aviation--A-6E, AV-8B, P-3, etc. In each instance, already low production levels in these programs were reduced to a pure misery level--with resultant increases in unit procurement costs.

The Navy seeing the cost of the F/A-18 program continue to skyrocket has attempted to offset the unpalatability of such a situation by "stretching out" the "buy" program from FY 1989 to FY 1990 and "rear end" loading of the procurement. For example, 450 (33 percent) of the 1,366 total aircraft will be purchased in the last 2 years (FY 1989-90) of the buy. Anticipated higher inflation rates in those latter procurement years--despite the maximum production rates of 225 per year--will only exacerbate the unit costs of those aircraft. Contractor officials advised the Investigative Staff that drastic fluctuations in annual production rates such as those projected for the F/A-18 are highly undesirable and will further aggravate costs to the program.

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RELIABILITY AND MAINTAINABILITY (R&M)

There has been great emphasis in the F/A-18 program toward the development of easy to repair and highly reliable systems. F/A-18 Reliability and Maintainability (R&M) was planned and implemented through design in order to minimize line maintenance functions which are extremely man-hour intensive. Contractually, the Navy rewarded excellence in reliability by providing profit incentives for reduced maintenance time per flight hour. The General Electric 404 engines are an example of a system wherein the contractor attained and surpassed Navy R&M requirements, and General Electric will earn 100 percent of its R&M incentive award.

R&M in high performance aircraft is difficult to predict because of high component stress and the compactness of the systems. The F/A-18 has more weight per cubic foot of volume than any other aircraft and, consequently, is the densest airplane ever produced. This density can hinder access to some of the aircraft's components. For example, the Environmental Control System (ECS) had to be completely redesigned due to its inaccessibility within the aircraft.

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The heart of the F/A-18 maintainability program is the Line Replaceable Unit (LRU) concept--the ability to simply "snap-out-snap-in" parts or even entire avionics systems. Development of computer and microminiature technologies permit plug-in concepts of repair. When a part fails, it is simply unplugged and a new one plugged in. Even the engines, a major system, can be replaced in this manner. The General Electric 404 engines can be removed from the F/A-18 and reinstalled by Navy personnel in 2 hours and 20 minutes--this is less elapsed time than for any other Navy aircraft.

Measurement of R&M performance is an undertaking of some complexity. Maintenance functions cover everything from checking the oil to complex depot-level repair of computer microchips as well as complete engine and airframe overhauls. To obtain a true picture of R&M performance in a system which uses the LRU concept involves singularly tracking every airplane, each of its parts, and every minute of attention devoted to it.

The Navy measures maintenance data at the Organizational level or "O" level, the Intermediate Maintenance level or IMD, and the depot or Naval Air Rework Facility (NARF). The IMD repairs parts for all squadrons in an air wing or on board a carrier, and responds to the supply department pool on a replacement basis, not directly to each aircraft. The NARF is responsible for major overhauls of

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airframe system improvement, additions such as engineering changes or updates, repair of major crash damages, and Service Life Extension Programs (SLEP). As previously stated, under the LRU concept of maintenance, visibility over maintenance man-hours dedicated to the repair of a specific aircraft or part thereof is lost. Consequently, Navy maintenance figures used to depict the R&M status of the F/A-18 reflect only those man-hours incurred at the "O" level and do not, as in the case of older systems, present a true picture of the total maintenance effort required to keep the aircraft operational.

The Investigative Staff was advised by Navy officials that new processors, computers, and electronic repair equipment will have to be installed aboard the aircraft carriers to handle the F/A-18 avionics systems in the IMD level repair areas. Those areas of the aircraft carrier devoted to IMD are already overcrowded with unique test and repair systems for other Navy missiles and aircraft. The Navy explains that F/A-18 equipment will replace those for the F-4 and A-7. However, those aircraft require less uniqueness of test gear than the F/A-18, and some test equipment for the F-4 and A-7 was consolidated with F-14 and S-3 aircraft equipment. The Navy says that it is "looking into" F/A-18 and F-14 test equipment compatibility. To date, only one piece of the IMD test equipment has been received by the Navy but more is on

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order. The cost of retrofitting aircraft carriers for the F/A-18 equipment is clouded.

The dilemma is basically that the F/A-18 is more electronically complex, and, consequently, requires new and special test equipment as well as highly trained personnel at the IMD and depot level. The cost of all this is unquantified. It is further complicated by the supply of avionics spare parts which in all other systems has been atrocious, and there is no reason to believe the F/A-18 will be any different. For example, the producer of the radar system on the F/A-18 is Hughes Aircraft Company, which also produces the thermal imagery system for the M-1 tank. The M-1 tank thermal imagery system not only suffers from spare parts problems but the supply of initial production issues is behind schedule as well. The F/A-18 prime contractor expresses confidence in its subcontractors to meet production schedules; based on demonstrated past problems with such complex systems, the Investigative Staff is not so convinced.

To determine R&M status of the F/A-18, two definitions are required--reliability and maintainability. Reliability can best be measured by a time-versus-event ratio, or as the ratio between the number of actual flight hours of an aircraft (the time) and a failure of any of its systems (the event). This ratio is expressed as Mean Flight Hours Between Failures (MTBF). The higher the number, the better the reliability.

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Maintainability can best be measured in reverse of reliability, that is, a ratio between the number of maintenance hours spent to achieve one flight hour. This ratio is expressed as Direct Maintenance Man-Hours per Flight Hour (DMMH/FH). The lower the number, the more efficient the maintainability.

Considered in tandem, these two measurements indicate how well an aircraft can be maintained, a factor which is directly reflected in numbers of aircraft available for mission assignment. Reliability (MTBF) shows how long an aircraft will operate before it fails, and maintainability (DMMH/FH) shows how much time is required to repair it.

As shown on the chart below, the F/A-18 R&M numbers are impressive when compared to other aircraft, but the numbers must be caveated because of the LRU concept in use on the F/A-18, which is not in use on other currently deployed Navy aircraft.

The Navy is highly optimistic that the F/A-18 at maturity will be extraordinary in R&M. The numbers on the chart for the F/A-18 are based on 2,500 flight hours achieved in a sterile test environment. The F-4, A-6, and A-7 aircraft data were derived from 15 to 25 years of rigorous aircraft carrier operations. The Navy set a maintainability goal of 17 man-hours per flight hour for the F/A-18 and is optimistic that this goal will be achieved.

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RELIABILITY/ MAINTAINABILITY

AIRCRAFT	MAINTAINABILITY*	RELIABILITY**
A-6E	49.8	0.7
A-7E	36.2	0.9
F-4J	53.3	0.7
F-14A	51.7	0.7
F-18A	9.7	2.37

* DIRECT MAINTENANCE MAN-HOURS PER FLIGHT HOUR
** MEAN FLIGHT HOURS BETWEEN FAILURE

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MISSIONIZATION--FLEET IMPACT

F/A-18 Multirole Fighter/Attack Design

A. The Fighter Concept

The F/A-18 is designed to perform two crucial combat missions--fighter and attack--with one pilot. It is a planned replacement for the aging F-4 which does perform both fighter and attack missions but with a two-man crew. Some military experts argue that two sets of eyes are required for high performance fighter aircraft as future air battles will not likely be fought "eye-to-eye and one-on-one." Intelligence data indicates that Soviet air power increases each year in numbers greater than U.S. forces, a fact which mandates that one U.S. fighter must be victorious over many enemy fighters. Many military tacticians believe that multiple target engagements at long ranges will likely replace the glamorous air-to-air dogfights of the past and that air "aces" of the future will likely be the radar intercept and weapons officers aboard modern technology two-seated fighters. The Soviets appear to accept this rationale as exemplified by two-man crews in new Soviet fighters. The U.S. Navy had previously supported this philosophy in its first-line fighter--the F-14.

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Arguments to refute this apparent contradiction in the F/A-18 are based upon historical data which cites surveys of the past three air wars in which successful combat kills were characterized by surprise attack and close shooting encounters. If these conditions ever again occur, the F/A-18's maneuverability will make it successful. However, dissection of the finding shows that "surprise" is the prime ingredient and "close" is a function of speed.

The F/A-18's best air-to-air missile is the AIM-7 SPARROW. It also is equipped with the heat-seeking AIM-9 SIDEWINDER. The SPARROW has an acceptable kill ratio within approximately 40 nautical miles, provided the pilot concentrates on a single target and holds that "lock-on" until the SPARROW impacts its target. The SIDEWINDER is a close range (2-5 nautical miles), heat-seeking missile in the tradition of an extended "dogfight" weapon. The F/A-18 is also equipped with a 20 millimeter gun for closer range shooting.

Unlike the F/A-18, the Navy's primary fighter--F-14, is crewed by a pilot and a weapons officer with supporting radar systems for the PHOENIX missile (AIM-54). The weapons officer can acquire multiple targets, launch multiple missiles, and do those things at standoff ranges exceeding 100 nautical miles that leaves the pilot free to fly the aircraft. In contrast, the

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lone F/A-18 pilot is a busy man with a restricted, short range, weapons platform.

B. The Threat

Traditional fighter roles the F/A-18 will be expected to fill are fleet air defense and fighter escort. In the defense of the Aircraft Carrier Battle Groups (CVBG's), threat definition and capability is paramount. The primary air threat is the Soviet BACKFIRE bomber, capable of speeds in excess of mach 2.5. While it has an air-to-air refueling capability, the BACKFIRE's unrefueled range is well in excess of 1,000 nautical miles. It can carry an air-to-surface missile (AS-4) at speeds up to mach 1.3 and subsonically launch the AS-4 at an aircraft carrier. The AS-4 missile travels to its target supersonically. Other threats are in the form of slower bombers such as the BADGER, BEAR, and BISON, which lack any of the BACKFIRE's antifleet capabilities. According to some Navy officers, slower, shorter range aircraft will not be a threat to the aircraft carrier force unless it is stationed close to a shore line or an enemy air base. The Vertical Short Take-Off and Landing (VSTOL) carrying KIEV class Soviet aircraft carriers are not believed to be a major air threat because of the short range of the VSTOL aircraft aboard.

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C. Fleet Air Defense Mission

The Navy, in recognition of the ever-increasing air threat to its CVBG's, developed and matured the F-14 "TOMCAT" fighter. The F-14 is equipped with the PHOENIX missile and is the only fighter in the U.S. inventory so equipped.

How the F/A-18 fits into this scenario is one of debate. It has several drawbacks. Notably, the short range of the F/A-18 weapons requires closer engagements, and its SPARROW missile must be terminally-guided to target. Additionally, it is more subject to ECM jamming than the PHOENIX and the F-14. The F/A-18 must also travel a greater distance to engage the threat.

Review of a 1980 Navy analysis clearly showed the F/A-18 is not a viable, effective weapon against the BACKFIRE bomber.

A recent force mix study conducted by McDonnell Douglas Aircraft Company concluded that the F/A-18 can destroy the BACKFIRE. A senior Navy officer readily admitted that the McDonnell conclusion was definitely erroneous, and such statements by the prime contractor pose a serious challenge to the validity of the entire study.

The Advanced Medium Range Air-to-Air Missile (AMRAAM) being sponsored by the Air Force may be a major improvement

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in missile performance for the F/A-18--it is not as good as the PHOENIX but better than the SPARROW. The Navy appears to be "betting on the come," hoping that AMRAAM will give the F/A-18 greater "kill power." However, the AMRAAM is falling behind schedule in development and has experienced a significant number of technical problems. An early Initial Operating Capability (IOC) date for the AMRAAM is predicted by some Navy officers.

D. Fighter Escort Mission

The fighter escort mission is exactly what it signifies--to escort and protect attack aircraft from enemy fighters. However, the F/A-18 has not met its specification in the fighter escort role as previously noted. The impact of this shortcoming is scenario dependent. For example, if the F/A-18 is assigned to escort the Navy's first-line attack aircraft, the A-6E, at its maximum radius of action, the F/A-18 will require fuel. If it engages enemy aircraft or performs any operational maneuvers requiring more than maximum fuel economy power, that refueling rate increases proportionately. In this role alone, it will require placement of additional tankers on the carrier, a situation which is already a problem for the Navy, and one which will be compounded by the F/A-18.

If the F/A-18 were to escort itself (a Navy promoted scenario), there are two solutions to its lack of range.

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The first is to increase tanker support and the second is to move the aircraft carrier closer to its target, thus increasing its exposure to enemy weapons. One solution is costly and operationally problematic, while the other could be catastrophic. The following chart depicts the Navy's tested computation of the fighter escort radius of the F/A-18 and the F-14.

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E. Maneuverability in Air-to-Air

If the F/A-18 in the fighter role has a redeeming quality, it has to be its maneuverability. The F/A-18 is acclaimed to be unsurpassed in "dogfight" aerobatics by current or recent past fighter aircraft due to its roll rate, acceleration, and high angle of attack responses in the low-to-medium low subsonic speeds. Its handling qualities are simple to master and its engine response from idle to afterburner represent a major technological advance. The F/A-18 cockpit has three Cathode Ray Tubes (CRT's) for information display on to the Heads Up Display (HUD). This allows the pilot to continuously monitor vital aircraft functions, i.e., radar, computer, and other avionics. All these advances are technology and design advantages which should make the F/A-18 successful in close air-to-air combat, if such occurs in future air combat.

F. Attack Concept

The F/A-18 is the first aircraft known to have been designed to perform its primary missions carrying external fuel tanks. The Investigative Staff could not determine whether this feature of the aircraft was a planned condition or if, as suspected, it is a product of design retrofit to accommodate a lack of capability. Whatever the reason, without the external tanks, the F/A-18 is

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incompetent to perform attack missions at any respectable range without great cost to the tanker force assets, or worse yet, repositioning the aircraft carrier literally "on the beach."

The interdiction role is the most likely of attack methods when considering the high density and defense hardened targets known to exist where the Navy might need to project power. The interdiction mission, as opposed to other attack profiles, is the most survivable according to most military tacticians. This mission requires the aircraft to transit near the target area, dive to low altitudes and transit the high threat area at high speed, bomb the target and egress at a low, under the radar, altitude to a safe distance out of "harms way" and to climb to

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altitude. This scenario makes it difficult for all aircraft in the Navy to do well at extended ranges, but the F/A-18 seems to suffer in range more than other attack aircraft. This lack of range is attributable to engine and airframe design features, i.e., it was designed for efficiency at high altitudes. Consequently, when the F/A-18 is required to fly at low altitudes and high speeds, as in a low altitude dash to the target, fuel consumption dramatically increases and, conversely, radius of action is proportionately curtailed.

The F/A-18 is highly maneuverable. Some Navy officers say, therefore, it will be more survivable as an attack aircraft. An equal number also advise that the maneuverability feature when over the target and during bomb delivery offers no advantage because of its contribution to a lack of accuracy. Possibly, the most accurate assessment of attack aircraft survivability was provided by one naval aviator who maintains that the concentrated surface-to-air missiles of the Soviet defense posture will make all aircraft equally vulnerable.

In using the F/A-18 in the attack mode, the Navy had no intention of replacing the A-6E. On the contrary, the F/A-18 is touted to be a replacement for the A-7E which performs the light attack mission, the viability of which is seriously questioned by some Navy officers on the grounds that it exposes more pilots

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with less weapons more often to the enemy defenses than longer range attack aircraft like the A-6E. The same argument would be applicable to the range/payload characteristics of the F/A-18.

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ALTERNATIVES

Doubts about the F/A-18 Program are multifold and focus on the issues of affordability and performance. Until recently the perceived lack of an alternative aircraft convinced many who would otherwise be in the forefront of opposition, to keep their peace. In addition, a sunk cost of $6 billion required to get the F/A-18 to its currrent status has been viewed as an impossible obstacle to program cancellation. Those who do promote the alternative issue note the sunk cost and point out that it will be worse if the program is allowed to continue: "The nose of the camel cost $6 billion while the rest of the camel will cost $40 billion or more."

The effort to balance the costs of the F/A-18 with its performance makes the potential $40 billion price tag hard to digest. The lack of a "quantum leap" in F/A-18 capability over current aircraft has fired the argument "is the F/A-18 worth its price tag?" Are there any alternatives that will reduce this price tag without a similar reduction in capability? The Navy has responded to the first question by a simple "yes"--it is a new airplane now in production. To the second question, the Navy contends that to start over would cost much more, and the Navy needs the aircraft now. However, opponents respond that "it doesn't need the F/A-18" at all.

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The Investigative Staff examined the leading alternatives presented and rejected by the Navy. No one alternative holds center stage, but the prevalent feeling among opponents is (when considering the entire list of weapons and systems badly needed by the Navy in the coming years), the F/A-18 and the huge share of aircraft procurement dollars it consumes is not a "quantum leap" forward in capability over present systems.

Why buy an aircraft with only comparable or less performance to current aircraft, when for the same or a less cost, you can increase the number and capability of the others, thereby increasing overall Navy air power subetantially?--a question posed by opponents and not satisfactorily answered by the Navy.

It is an accepted fact, that the Navy does not intend to replace either the F-14 or the A-6E with the F/A-18. Rather, the Navy sees the F/A-18 as a multipurpose aircraft--both a fighter and a bomber. They would have you believe that the F/A-18 is an aircraft that can escort itself and change its mission as a "chameleon changes its colors," to suit the environment. This rationale raises more than the opponents' eyebrows and they simply say "who's going to fly them?" The simple fact remains, the Navy has fighter pilots and it has attack pilots. If you try to merge the expertise of either with the other you lose competence in both areas. This fact combined with the F/A-18's demonstrated lesser

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performance as both a fighter and attack aircraft leads one to question the viability of the concept upon which the design of this aircraft was based. Therefore, it can be said: "a fraction divided by a fraction is always less." This was expressed by a retired flag rank officer in respect to the F/A-18's dual capability. Moreover, the Navy has not adequately addressed the pilot question nor can it explain the effect of the pilot plus aircraft impact on capability.

The alternatives reviewed were: the F-16, winner of the Air Force flyoff in which the F-18 was the loser; the A-7X which is a new A-7E with a new engine; the F-15E Strike Eagle now prototyped by the Air Force for ground attack also with a new engine; or no new aircraft development at all, but rather, an increased, more cost effective production rate of existing inventory fighter/attack aircraft.

The F-16, at the time of Air Force selection, was presented to the Navy in its marinized version. The Navy examined it and found that it could become capable of aircraft carrier operation only after a major redesign. It also had only one engine and could not meet both the fighter and attack requirements of the Navy's fighter/attack aircraft development (VFAX) program.

The F-15E STRIKE EAGLE is larger than the F/A-18 and compares with the F-14 in costs. Again marinization would require a major

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redesign. The added costs involved eliminated any further consideration of these alternatives by the Navy.

The A-7X was a proposal requested by the Navy from the Vought Aircraft Corporation which the Navy later rejected and labeled unsolicited. The proposal involved the reengining of the A-7E with either two GE-404 engines or one GE 101DFE engine. The Vought Corporation offered to build the A-7X using off-the-shelf technology under a fixed price, multiyear contract for a fly away cost of approximately $11 million each. This is often compared to the $20-$25 million cost of the F/A-18. The Navy rejected the proposal indicating it was overly optimistic in its treatment of research and development costs and that multiyear funding provisions upon which much of the cost savings were projected, were not Congressionally approved.

The A-7X proposal envisioned greater range, speed, load carrying capability, and fuel efficiency over the A-7E. The A-7E now carries ordnance a greater distance than the F/A-18. It appears the Navy did not question the technical approach of Vought's proposal and only challenged the A-7X's cost estimates as unrealistic.

Moreover, the Navy was also concerned the A-7X could not fill the Marine Corps' requirements for a fighter. The Navy again rejected the proposal and disregarded Voughts' willingness to produce the

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A-7X on a fixed price contract with or without multiyear procurement, a difference that both the Navy and Vought agree is only plus or minus 7 percent in cost.

Alternative to the F/A-18 Dilemma

Based on its examination, the Investigative Staff believes that an alternative to the F/A-18 dilemma, both in terms of costs and performance, is found in the current Navy aircraft inventory. That is: (1) expand the procurement of F/-14 and A-6E aircraft to fill projected Navy needs because these aircraft are equally or more competent in their respective roles; (2) extend the service life of current Marine Corps fighters along with a vigorous R&D effort to develop the VSTOL supersonic fighter potential of the AV-8B; and (3) modernize current aircraft avionics and perform reengining to meet the near term needs of the programmed 15 carrier air wing Navy.

The prospect of applying the $40 billion projected for the F/A-18 to current aircraft programs offers an opportunity for realistic and progressive growth in Naval Aviation. For example, the F-14 is an expensive fighter, but it is the only one that addresses the threat in the fleet air defense sceanrio. The F-14, however, has suffered from a lack of a competent engine to reach its full potential. The Navy tested the GE-101DFE engine in the F-14, and the results were exciting to Navy pilots. The new engine gave the

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F-14 an increase in all parameters of performance. For reasons of affordability, however, this action to reengine the F-14 is being delayed by the Navy until the 1986 POM with the first F-14C to carry new engines in 1987 and planned retrofit thereafter. Moreover, the contractor building the F-101 engine says that if the Navy initiated such an action now, the new F-14C's built in 1984, and thereafter, would have new F-101 engines, avoiding the added cost of retrofit with possibly as much as a $400 million savings resulting.

The Marine Corps has openly advocated a full fighter and attack VSTOL force. VSTOL attack aircraft (AV-8B) are currently in production. Like the F/A-18, the AV-8B is also built by McDonnell-Douglas. To achieve a VSTOL supersonic fighter capability, according to engineers, is not a matter of overcoming technology barriers, but simply funding the development. The Rolls-Royce "Pegasus" engine in the AV-8B is currently being tested in the supersonic mode by its builder. The concept of "plenum chamber burning," wherein the engine's thrust is vectored, has proven successful. The airframe also has been test flown, less plenum chamber burning engine, by McDonnell-Douglas. The test required a simple wing and intake modification to the current AV-8B test aircraft. It is believed proper R&D funding

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could make a supersonic VSTOL a reality by 1987, according to the contractor's engineers. The Marine fighter requirement need is thereby solved and its desire for a full VSTOL force is close to achieving reality.

Costs of Alternatives
to the F/A-18 Program

In an effort to ascertain cost comparisons associated with the selection of an alternative, the Investigative Staff established cost and production levels found in the Navy POM 83 documents as a baseline. This baseline data is portrayed in the chart on the following page.

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POM 83 NAVY AIRCRAFT PROCUREMENT
PROGRAM QUANTITY COST
FY $ IN MILLIONS

AIRCRAFT	1982	1983	1984	1985	1986	1987	TOTAL
F-14A	30/$1,162	24/$1,162	30/$1,319	30/$1,348	30/$1,480	30/$1,593	174/$8,064
Unit Cost	($38.7)	($48.4)	($43.9)	($44.9)	($49.3)	($53.1)	($46.3)
A-6E	12/$295	12/$336	12/$354	12/$376	12/$373	12/$381	72/$2,115
Unit Cost	($24.5)	($28.0)	($29.5)	($31.3)	($31.0)	($31.7)	($30.0)
F/A-18	63/$2,470	66/$2,208	96/$2,769	108/$3,119	132/$3,809	132/$3,862	597/$18,237
Unit Cost	($39.2)	($28.8)	($28.8)	($28.8)	($28.8)	($29.2)	($30.6)
TOTAL	105/$3,927	102/$3,706	138/$4,442	150/$4,843	174/$5,662	174/$5,836	843/$28,416

As can be seen from the chart, the Navy is programming a very low F-14A production rate over the entire 6-year spectrum (an average of 29 per year.) The A-6E rate is less than that--currently projected at only 4 per year during the same period. However, the POM 83 F/A-18 program is "rich" both in dollars and in units to be procured, with annual production rates reaching 132 by 1986, and procurement dollars of $18.2 billion projected for the 6-year period. However, these annual production rates are less optimistic than those projected in the POM 82 data originally submitted to the Investigative Staff by the Navy--although the costs are higher. It is the opinion of the Investigative Staff that the Navy lowered the production rates and "stretched out" production in an attempt to lower the impact of the F/A-18 buy on the entire Navy aircraft procurement program.

As previously noted, the Investigative Staff, after interviews with both active duty and former high ranking Navy officials, determined that the light attack aircraft was no longer a viable "fighting machine" and for that reason, the A-7E and/or the A-7X were not considered in establishing potential alternatives to the F/A-18 in the attack role. However, the A-7E <u>is</u> programmed to remain in the active force as an attack aircraft until the 1990's.

Production capabilities data were obtained regarding the A-6E and F-14A aircraft from Grumman Corporation. They advised that

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current tooling assets would permit escalation of production rates of A-6E aircraft from 12 to 72 per year by FY 1985, with a maximum capability of producing 96 F-14A aircraft by the same time period.

The chart on following page depicts production rates and costs--both total and unit procurement for the POM 83 cycle. Parameters were established by the Navy in deriving these estimates and those parameters are identified on the chart.

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A POTENTIAL ALTERNATIVE TO F/A-18
PROCUREMENT
MILLIONS IN THEN YEAR DOLLARS

AIRCRAFT	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	TOTAL
F-14	36/$1,440.6	48/$2,256.6	84/$3,513.2	96/$3,847.1	96/$4,041.1	96/$3,554.0	456/$18,652.6
Unit Cost	($40.0)	($47.0)	($41.8)	($40.0)	($42.0)	($37.0)	($40.9)
A-6E	24/$618.5	36/$922.6	54/$1,472.2	72/$1,896.9	72/$1,963.6	72/$1,953.6	330/$8,827.4
Unit Cost	($26.4)	($28.0)	($28.6)	($27.7)	($27.3)	($27.0)	($26.7)
Total	60/$2,059.1	84/$3,179.2	138/$4,985.4	168/$5,744.0	168/$6,004.7	168/$5,507.6	786/$27,480.0

Parameters:

(1) July 1981 inflation factors used.
(2) Long lead procurement funding is shown.
(3) Programmed modifications shown in FY 1983 and FY 1986 data for both F-14 and A-6E.
(4) Does not include reengining of F-14A with F101 engines.
(5) Does not consider any funding beyond FY 1987.

Comparisons of current POM 83 projections for Navy aircraft procurement extracted from each of the two foregoing charts illustrates that if the F/A-18 program were eliminated and maximum production rates were established for the F-14A and A-6E aircraft during the POM 83 time frame, an aviation force of greater capability (despite the loss of 57 aircraft--from 843 to 786) both in the fighter and attack role, would result. Cost comparisons from the Navy provided data show that almost $1 billion in savings would also result from selection of the F-14 and A-6E alternative--$27.48 billion versus $28.42 billion.

USE

This report was provided to Defense for comment.

RESPONSE

The objections presented by the Navy in response to the Investigative Staff's report on the F/A-18 were in two forms. First, the Navy claims there were "--a number of tactical and strategic assertions which are directly contrary to the considered military judgement of the Chief of Naval Operations, the Commandant of the Marine Corps, and the pilots flying the F-18." Second, the Navy claims there were "--a number of detailed errors of fact, omission and mistaken emphasis--."

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COMMENT

All of the tactical and strategic assertions presented were identical to those used and projected by the Navy itself, and all of the performance and cost data used in the report were provided in their entirety by the Navy to the Investigative Staff in direct response to questions posed, even when that data were known by the Investigations Staff to be consistently in favor of F/A-18 through "questionable" projections.

Several other investigative memoranda on technical aspects of the F/A-18's performance and equipment were provided for the information of the Committee.

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ARMY MEDICAL UNIT SELF-CONTAINED TRANSPORTABLE (MUST) PROGRAM

The Investigative Staff is currently making extensive inquiries into the U.S. Army's MUST program. Information developed thus far, in certain instances, directly contradicts hearing testimony offered by Army officials relative to the MUST program.

On March 14, 1979, the Army's Surgeon General testified that all components of the MUST program were satisfactorily tested and evaluated by the Army prior to their adoption as standard. He further stated that the major problems in the MUST program resulted from procurement of materiel from marginal manufacturers on a low bid basis which then required retrofit prior to use.

In a letter to former Secretary of Defense Harold Brown on the same date, the Chairman of the Subcommittee on Defense indicated he was greatly disturbed to learn that the Army had been receiving defective equipment from contractors who were not performing in accordance with contract specifications. Among other things, the Chairman requested to be advised as to what steps the Army had taken to make the contractors pay the cost of these defective materiels.

To date, the Investigative Staff has learned the Army has lost at least $8.3 million as a consequence of the procurement of defective MUST equipment. It will be unable to recover any of this sum because it provided the contractors involved with poor or erroneous technical data packages, directed the purchase of incompatible items from subcontractors, or the Defense Contract Administration Service (DCAS) accepted the equipment as serviceable, thus relieving the contractor of any financial liability.

The following are examples of major contracts in which the Army has suffered a loss due to significant problems with the procurement of defective MUST equipment:

Contract DAAK01-68-C-8162 (June 1968)

The Army ordered 384 multipurpose shelters from the Missouri Research Manufacturing Company. The technical data package provided by the Army specified a "cold bond" process be used to manufacture these shelters. In the middle of production, delamination of the aluminum-faced honeycomb panels in the shelters already fielded was discovered. It was determined, use of a 'hot bond" manufacturing process was necessary to prevent this condition. As a result, it was necessary to dispose of the 207 shelters manufactured with the "cold bond" process, resulting in a loss to the Government of over $2.3 million.

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Contract DAAK01-72-C-2102 (August 1971)

The Army ordered 315 corridor connectors and 355 passageways from the Inflated Products Company. After the items were delivered and accepted by the Government, it was determined they were unusable because of split web seams, faulty relief valves, and faulty adhesive. Attempts were made to hold the contractor responsible, but the Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) legal office determined the fault was in the acceptance of inferior equipment, packing, and packaging by the DCAS. The loss to the Government in this instance was $2.5 million.

Contracts DAAK01-75-C-2031 (January 1974) and DAAK01-76-C-5130 (October 1975)

The Army ordered 172 five section inflatable shelters from the Inflated Products Company. The contractor did not pack the shelters according to the Army's specification. However, a representative of DCAS inspected the packaging and told the Army to accept the shelters because the packaging was "better than called for in the Army's specification." The Army stored 44 of these inflatable shelters outside, unprotected at one of their depots. Later, when the 44 shelters were shipped to Europe it was discovered, because of poor packaging, the shelters were full of water. The cost to refurbish the water logged inflatables and make them serviceable was $109,034.

Contracts DAAK01-75-C-2031 (January 1974) and DAAK01-76-C-5130 (October 1975)

The Army purchased 416 inflatable shelters from the Inflated Products Company and the Firestone Tire and Rubber Company. Both of these firms subcontracted the production of zippers for the shelters to the Coats and Clark Company. This company went out of business after producing a large number of zippers. Thereafter, the Army determined that the Scoville Manufacturing Company could provide the zippers and directed Inflated Products and Firestone to purchase zippers from this firm. The inflatable shelters were ultimately received by the Government with the Scoville zippers and accepted by DCAS as serviceable. It was later determined in field tests that the zippers were not holding properly because the zippers manufactured by Scoville were not compatible with the Coats and Clark zippers. As a result, all 416 inflatable shelters will be retrofitted with "Beckett Lace and Velcro fasteners" to replace the zippers. To further compound the situation, most of these shelters are stored in Europe and will have to be shipped to the United States for retrofitting. Since the Army certified the Scoville zippers as serviceable and actually directed their purchase by the prime contractors, the Government will be unable to recover any of the resultant loss which is estimated to be over $3.4 million. According to Army officials, this could have been prevented if the

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Government had purchased the production equipment and tooling from Coats and Clark when they went out of business. The Army could offer no explanation why they failed to do this.

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USE

The above information was presented to the Secretary of Defense for comment when he appeared before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was provided for the record.

RESPONSE

There is no contradiction between testimony of The Surgeon General on 14 March 1979 and the information developed by the Investigative Staff. To put this matter in proper context, The Surgeon General can only address questions concerning contracts for non-medical equipment from a user's viewpoint. None of these purchases are made under the jurisdiction of The Surgeon General. Members of his staff obtained telephonic information from appropriate personnel of US Army Troop Support and Aviation Readiness Command and Natick Laboratories to respond to specific questions raised. The alleged $8.3 million loss, comprised of several contracts, is explained as follows:

a. The $2.3 million loss was the result of a broad technical data package which did not specify the detailed manufacturing process, including bonding techniques. This was not considered necessary since numerous shelters had previously been produced successfully using the same technical data package. Therefore, the technical data package provided by the Army was considered satisfactory at the time and the manufacturer should have discovered during the initial production phase that his "cold bond" was not satisfactory and taken corrective action to provide a suitable product.

b. Substandard materiel acquired under the contract for corridor connectors and passageways reported as a $2.5 million loss resulted not from inadequate specifications in the technical data package but rather from the acceptance of inferior materiel by the Defense Contract Administration Service (DCAS). Therefore, faulty acceptance procedures were the problem and effective action has subsequently been taken by DCAS to improve acceptance criteria and performance.

c. The $.1 million loss regarding inflatable shelters was also a result of DCAS acceptance of equipment which, as indicated in the S&I report, was not packed according to specifications. Packing specified in these contracts was to protect contents against any weather conditions.

d. The $3.4 million for the replacement of zippers was a result of an improvement to the shelters closure system determined to be necessary after extensive actual use under field conditions rather than directly related to an incompatability problem with the two different manufacterers products. This incompatability problem was dealt with by

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issuing only inflatable shelters having the same manufacterers zippers to one individual hospital. It was recognized at the time the Coats and Clark Co. discontinued production of the zipper used in the original quantity of inflatable shelters and that no other closure manufactured could mate with Coats and Clark zippers. The most satisfactory substitute zipper as manufactured by Scoville Co. was specified for all new production of inflatable shelters. The improvement to the shelter closure system is the Becket Loop Velcro closure system which has been incorporated in the present production contracts, and existing inflatable shelters are programed for retrofitting.

USE

Further questions and responses on the above issues were covered in Part 2 of the hearings before the Defense Subcommittee on the FY 1982 Defense Appropriation request.

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ELECTRONIC TIME FUZES

The Army Materiel Development and Readiness Command (DARCOM) has persisted in funding the development and production of an electronic artillery time fuze contrary to user requirements. DARCOM insistence in this matter reached the point of discontinuing the production of mechanical time fuzes prefered by the Army Artillery Center in favor of the electronic fuze. This course of action was being followed even though the electronic time fuze was operationally unsatisfactory and more expensive to produce. Furhermore, DARCOM proposed to manufacture greater quantities of the electronic time fuzes. The excess cost of this program would amount to about $200 million by 1990 at which time the "Howitzer of the Future" would possibly be available and generate a "real" requirement for the electronic time fuze.

The anomolies discussed above were pointed out by the Committee to the Army a year ago. To date, no decision has been made by the Army to cancel electronic time fuze procurement. The Army is proceeding with redesign of a similar electronic fuze.

USE

At the time of the Secretary of Defense's initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request, the above information was provided for response. The following comments were provided for the record.

RESPONSE

The Army decision to procure the M724 fuze was made based upon careful study of the best available information.

a. The Mechanical Time industrial base was shrinking and MT producers were experiencing great difficulty in producing an acceptable M577 fuze.

b. An Economic Analysis performed by the U.S. Army Materiel Systems Analysis Agency (AMSAA) Indicated that for a range of procurements through the year 2003 the costs of the ET and MT fuzes would be approximately equal. This was later confirmed by the General Officer Review and an Army Science Board study.

c. Neither the ET nor the MT producers could alone support mobilization requirements for precision time fuzes.

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d. Electronic fuzing was and still is recognized as having much greater growth potential and applicability to future Field Artillery weapons systems than mechanical fuzing.

e. The Field Artillery Center reluctantly concurred in the decision to type classify and procure the M74 fuze and the associated fuze setter.

Recent developments however have invalidated some of those earlier assumptions leading to cancellation of the fiscal year 1981 procurement.

a. Earlier production problems with the MT fuze have been corrected.

b. Acceleration of the development of the Division Support Weapons System and the remotely set XM762 electronic time fuze has reduced the maximum procurement time for the M724 to the end of fiscal year 1986 which has reduced quantities and increased cost.

c. The Office of the Secretary of Defense terminated procurement of the M724 in the fiscal years 1982-86 POM.

d. User resistence to the deployment of the M724 has increased.

It should be pointed out however that the Artillery Center never determined that the M724 fuze was "operationally unsatisfactory".

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TELEPHONE SERVICE FOR DOD

The Government is operating two long distance telephone systems, and two agencies, the Department of Defense and the General Services Administration are providing local service in metropolitan areas.

The General Services Administration (GSA) is charged to manage public utility services, including prescription of policy and methods of procurement. The GSA provides local and long distance telephone service to all Government users. The DOD provides long distance service on its Autovon telephone system. In addition, DOD is in the process of instituting consolidated local service in metropolitan areas. In effect, the Government is operating two long distance systems, and two agencies, DOD and GSA are providing local telephone service in metropolitan areas. The Investigative Staff recommends the consolidation of these systems under GSA. This we believe to be in consonance with GSA's responsibilities under the Property Management Act. Consolidation would make reductions in telephone costs in the order of tens of millions of dollars by use of centralized attendant switchboards, thus eliminating operators, and common use of long haul circuits. The elimination of duplicating staffs engaged in analyzing requirements, savings of at least 200 people.

The Air Force has a dial central office replacement program, Scope Dial, under whichs 38 switches are to be procured at an estimated cost of $80 million. Although budget justifications indicate these switches are to be commercial off-the-shelf switches, the specifications include features that switch manufacturers estimate increases their costs two to four times. Further, technical specifications are used rather than functional specifications, thus limiting competition.

The Army has performed cost analyses to determine the least cost method of replacing dial central office equipment. It was proved that purchase was the least costly, however, in the Army competition for procurement funds, the central office equipment lost to other priorities, thus the equipment is being leased at a penalty of about $7 million over a 10-year period.

USE

The Secretary of Defense was given the above information at the time of his initial appearance before the Defense Subcommittee to discuass the FY 1982 Defense Appropriation request. The following response was provided for the record.

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RESPONSE

GSA and DOD have signed an Interagency Agreement to jointly study and implement consolidated telephone systems in metropolitan areas under single management. Such systems will be known as Government Metropolitan Area Telephone Systems (GMATS), and as prescribed in the Agreement, the major user in most cases will manage the consolidated system. Action is underway to establish procedures for conducting joint studies and to select areas where the consolidation of civil agency and DOD telephone systems can provide operational and cost-savings benefits. The DOD has had a major consolidation program underway and experience indicates that major dollar savings will accrue primarily through the reduction of the operator, management and maintenance personnel; however, it should be realized that the implementation cycle for such consolidated systems requires a period of about 4 years for study, procurement actions, equipment delivery, installation and cutover.

With regard to long distance systems, the DOD and GSA are not offering competitive but complementary systems. As evidenced in prior year Congressional testimony and budgetary actions, the DOD is using the GSA-operated Federal Telecommunication System (FTS) on an increasing basis. In fact, the DOD is the third largest user of the FTS. Also, at the request of GSA, efforts have been initiated towards interconnecting GSA's FTS and DOD's AUTOVON systems in the event of crises or emergencies. DOD has been studying alternative systems to AUTOVON with emphasis on greater survivability for critical crisis, pre-attack, theater non-nuclear war, early trans-attack, and peacetime readiness requirements and lower operational costs. While management of communications systems supporting combat elements of DOD cannot be given to an organization outside the DOD chain-of-command, it is DOD's intention to fully explore the use of the Federal Telecommunications System and other less costly approaches to handle non-command/control traffic. GSA is being kept informed of the DOD planning efforts, and we intend to work with GSA with regard to satisfying non-command/control needs. Finally, with regard to long distance systems, we believe the HAC S&I proposed elimination of staffs as being duplicative is misleading because these staffs are each addressing separate groups of user needs; thus, since overall workload will not decrease, any combing action will not reduce the requirement for approximately the same number of personnel.

Subsequent to the HAC S&I report, the Scope Dial program was awarded to Northern Telecom Inc., on March 13, 1981. In this regard functional (performance) specifications were used for this multi-year/multi-switch procurement, and the telephone switches to be delivered are commercial off-the-shelf units which have been modified (software only) to

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meet unique military requirements. These modifications are relatively minor and of low dollar value--far below the two to four fold increases cited. The fact that the first Scope Dial system will be installed and operational within 14 months is further indication that off-the-shelf-equipment is involved.

While higher Army priority programs may have precluded the purchase of some telephone switching equipment, the lease of modern electronic telephone systems still provides significant savings due to reduced personnel needs; therefore, system leasing should continue. Wherever possible, however, the purchase route should be followed, subject to the provisions of OMB Circular A-76, but when funding is a problem, the lease with option to purchase approach should be considered.

COMMENT

Despite a DOD/GSA interagency agreement to provide local telephone services on a consolidated basis with single management through GMATS, the military services are continuing to independently provide local telephone service and develop new Defense Metropolitan Area Telephone Systems (DMATS) in duplication of GSA's existing FTS. In addition, the Defense Communication Agency is independently developing a new long system called Defense Switched Network (DSN) to replace the existing AUTOVON system.

DOD's use of FTS has been minimal and fragmented. Although the Army's use of FTS has been slowly increasing, the Navy has been reluctant to take advantage of available services and Air Force's participation has been virtually non-existant. That DOD is the third largest user of FTS services is misleading. By virtue of its size, geographical dispersal, and number of personnel in comparison to other Federal Agencies, only minimal utilization of FTS has been made.

Saving of tens of millions of dollars are still possible if DOD and GSA telephone service activities were combined in fact rather than in name only.

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Report of March 17, 1981

DOD SATELLITE COMMUNICATIONS SYSTEMS

The Investigative Staff has developed information relative to possible underutilization of the DOD Satellite Communications System satellites. Data obtained indicates that the DOD satellites have the equivalent of 400 channels of idle capacity available for east coast to west coast telephone transmission, as well as for circuits to Alaska and Hawaii. Both DOD and GSA are currently leasing similar circuits. GSA is leasing 312 coast-to-coast telephone circuits at a cost of $2.8 million annually, 41 CONUS to Alaska circuits at a cost of $1.75 million annually, and 26 CONUS to Hawaii circuits at a cost of $636,000 annually. The cost to modify existing ground stations to take advantage of the idle satellite capacity has been estimated at about $600,000.

USE

The above information was furnished to the Secretary of Defense for comment in his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply for the record.

RESPONSE

The Defense Satellite Communications System (DSCS) is designed to accommodate unique and vital user requirements in all electronically jammed environment. When the satellite is not being jammed or heavily loaded by military needs in a crisis and if the satellite itself is not degraded by component failure, it can accommodate other user requirements. In particular, the EAST PAC DSCS satellite could accommodate the identified 400 GSA channels; however, since this satellite's primary mission is military requirements and supporting the National Emergency Airborne Command Post, these GSA circuits would be preempted without notice in order to maintain military command and control circuit connectivity.

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Report of March 17, 1981

NAVIGATIONAL POSITIONING SYSTEMS

Navigational Positioning Systems presently used and being developed by the Federal Government are duplicative, expensive to operate and maintain, and provide less than optimum services.

DOD is developing a satellite system, the Global Positioning System (GPS), which will have the capability of replacing a large number of existing systems and providing superior performance. Significant cost avoidances could result from implementing the GPS and phasing out, as rapidly as possible antiquated systems. The economic viability of GPS is dependent on the phaseout schedule. GPS is scheduled to become operational in FY 1986-87.

The Surveys and Investigations Staff, in May 1979, recommended that DOD and Department of Transportation (DOT) phaseout those systems whose functions can be provided by GPS; the phaseout to be implemented at the earliest possible time commensurate with safety of life and property. Systems with functions which could be provided by GPS include the DOD's Tactical Air Navigation (TACAN), and its Federal Aviation Administration (FAA) counterpart, VORTAC. Both DOD and DOT requested funds to procure new TACAN-VORTAC equipments in FY 1980. Considering the early planned operational capability of GPS (FY 198687), and the capabilities of Government-owned TACAN overhaul and maintenance facilities, the least costly way to provide TACAN service during the interim period of conversion to GPS is to overhaul and repair existing TACAN-VORTAC until such time as GPS becomes operational.

The DOD Appropriations Bill 1980 Report of the Committee on Appropriations, pursured the Surveys and Investigations Staff recommendations and directed DOD to follow the overhaul and repair path rather than procure new TACAN's. However, the Investigative Staff has learned that the Navy is currently planning to procure 75 TACAN's to replace all existing fixed base TACAN's over a 4-year funding period from FY 1980 through FY 1983 at a total cost of $13.2 million.

The purpose of the GPS dvelopment was to provide better navigation capabilities and decrease the cost by eliminating the myriad of navigation systems which could be provided by GPS. Information developed by both the General Accounting Office and the Surveys and Investigations Staff indicates the

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Government has the in-house capability to rebuild TACAN's and VORTAC's to "like new" condition, at a fraction of the replacement cost. Further, a number of the locations for which replacement equipments are programmed, could be served by VORTAC's/TACAN's currently in adjacent areas.

In view of the overhaul potential and its significant cost advantage, to procure new equipment would only perpetuate the existing duplication of navigation systems.

USE

The above information was provided to the Secretary of Defense for comment at the time of his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply for the record.

RESPONSE

Although GPS will provide an initial three-dimensional navigational capability in 1987, the date that is more relevant to phase out of ground based navigation systems (TACAN, VOR, LORAN, etc.) is the date GPS user equipment is installed on aircraft needing the navigation information. User equipment acquisition begins in fiscal year 1985. Installations begin in late fiscal year 1985 or early fiscal year 1986 and continue until 1995. The majority of ground based TACANs are required until the early-to-mid 1990s. A decision is yet to be made on how the shipboard relative navigation function will be performed. Shipboard TACAN equipment is not yet programmed for phaseout.

DOD is not confident that it has the capability to overhaul and repair existing ground TACAN/VOR/VORTAC facilities to the extent necessary to provide reliable service into the 1990s. The Air Force, for instance, lists twelve subassemblies which must be replaced in an overhaul program for which there is no current source of supply. Even if the government were to pay whatever is necessary to induce manufacturers to build like items, twenty-five year old components and inter-rack cabling will remain to cause problems.

Both the Air Force and the Navy have determined that total replacement of ground TACAN (and VOR) electronics is necessary to provide required operation availability until all aircraft are GPS equipped. The Air Force is pursuing Phase 3 of a modification program (antennas and monitors have already been replaced in fixed base facilities). The Navy is pursuing an acquisition program at similar unit cost. Funds for these purposes were included in both the fiscal year 1980 and fiscal year 1981 budgets. Requirements that were critically reviewed by the HAC and other committees were eventually supported in the appropriations bills.

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DOD activities have surveyed their ability to use adjacent FAA NAVAIDs in lieu of existing military TACANs and VORs. FAA facilities are not sited to provide optimum approaches to DOD runways. Their use, where available, increases landing minima beyond that acceptable to operational commanders.

DOD is sensitive to the opportunity to reduce navigational costs represented by the GPS program. Both the Federal Radionavigation plan and the JCS Master Navigation plan reflect its intent to eliminate redundant systems as soon as this can be done without mission impact. That point is still at least 11 years away. The majority of DOD aircraft will rely on TACAN service for non-precision approach and landing, for tactical rendezvous and for finding airfields/ships for most of that time. Reliable TACAN beacons are essential for DOD combat operations and for day to day training and flying safety. Current beacons are not now sufficiently reliable to meet the current need and will perform even less well in the future if not extensively modified or replaced.

More recent testimony on the issue was presented by the Air Force in hearings before the Defense Subcommittee on the FY 1983 Defense Appropriation request. This testimony provided further elaboration on the initial Defense reply.

COMMENT

If supported by Congress the Global Positioning System (GPS) will be fully operational by 1987. The full equipage of Air Force aircraft with GPS in the shortest possible time depends on Air Force committment to the effort.

Given the uncertainty of the availability of GPS in aircraft the Air Force has been reluctant to take any interim measures such as a repair and overhaul program for existing VOR/TACAN equipment.

Subsequent to this initial effort an indepth examination was made of the Air Force VORTAC Class IV B Modification Program and the report on that investigation follows.

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Report of October 7, 1981

AIR FORCE VORTAC CLASS IV B MODIFICATION PROGRAM

Equipment to be procured under the Air Force Class IV B Modification program are VOR's (Very High Frequency Omni-Directional Range), TACAN (Tactical Air Navigation), and VORTAC's, which are installations providing both VOR and TACAN service. These equipments provide enroute navigation, terminal navigation and can provide a capability for non-precision landings. Generally, VOR serves civil and TACAN serves military aviation, however, significant numbers of military aircraft use VOR. VOR and TACAN are in different frequency bands and therefore are not interoperable.

Background

VOR/TACAN's were installed during the late 1950's. A modernization program was initiated in the late 1960's and new antenna and monitor/control groups were installed. In 1978 Air Force approved a program to replace, as separate items, 63 VOR and 150 TACAN transponders at an estimated program cost of $35.7 million. The program was justified on the basis of degradation of reliability and increased maintenance required by the aging equipment.

The Air Logistics Command Small Business office in 1979 requested these procurements to be "set-aside" for small businesses. The contracting officer rejected the request. The Commander, Sacramento Air Logistics Center, overturned the contracting officer's rejection and agreed to the set-aside. He directed a two step acquisition process be employed to ensure the small business firms were capable of producing. This decision was reviewed and a recommendation to the Secretary of the Air Force to support the set-aside was made by the Assistant Secretary for Research, Development, and Logistics.

The intensity of competition for this procurement was severe. It was reportedly driven by the fact that most of the worlds VOR's and TACAN systems were installed during the same time period and and thus would require replacement soon after the U.S. replacement. It was felt that the winner of the Air Force procurement would enjoy an advantage in marketing overseas. Both large and small business sought Congressional support for their positions. When it appeared likely the procurement would be designated a small business set-aside, several large firms teamed with small firms in order to participate in the procurement in the role of subcontractors.

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In January 1980, the Secretary of the Air Force, faced with pressures from all sides, requested a reassessment of all issues involved in the set-aside. At the same time, the Air Force Communications Command (AFCC), which operates and maintains the VOR/TACAN system, requested Air Staff consider linking the acquisition with an on-going FAA VORTAC development/procurement. The request was denied, stating such action would represent a sole source procurement of an unproven system.

AFCC then reevaluated the alternatives to meeting the requirements and recommended a consolidation of the VOR/TACAN procurement. AFCC argued that by utilizing state-of-the-art technology, including microprocessor driven fault detection and isolation, and remoting the operational/status information to a central maintenance facility, the skill levels required could be lowered and the numbers of maintenance personnel required by AFCC reduced by 79 men. The program funding estimates for the consolidated approach was $27.8 million, as opposed to the old separate item procurement program costed at $35 million. In April 1980, the Secretary of the Air Force approved the proposal. The Small Business Administration representative at Sacramento Air Logistics Command requested the new program be designated a small business set-aside. This request was rejected by the contracting office, the Sacramento Air Logistics Command, the Air Staff, and the Air Force office for Small and Disadvantaged Business Utilization.

The RFP for the new procurement was issued in May 1981 with copies provided all interested contractors. In September 1981, four contractors submitted bids. Contract award is scheduled for December 1981.

New replacement VOR/TACAN's may not be required. The Global Positioning System (GPS) will have the capability to provide the VOR/TACAN functions. This capability has been tested. The justification for the GPS was its ability to replace a myriad of navigation/positioning systems. VOR/TACAN is planned to be replaced by the GPS. GPS is scheduled for full operation in 1987. Thus, the new VOR/TACAN's would be utilized only during the interim period pending Air Force conversion to GPS. The conversion period is dependent upon the priority assigned the effort. The ALC depot estimates a TACAN can be overhauled, and would have a life expectancy of about seven years, for about $25,000. A new TACAN cost about $100,000. The FAA is replacing its VOR/TACAN's and will make them available for parts or complete replacement equipment free. Both the Suveys and Investigation Staff and the GAO have reported they believe the least costly approach to meeting the VOR/TACAN requirement during the interim period pending conversion to GPS is to repair or overhaul the existing equipment as required.

The future of the GPS is presently unknown. The Senate Armed Services Committee has supported the program in the FY 1982 authorization, the House has not. As of this writing, the House-Senate conference has not taken place, thus the issue is not now resolved.

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If the GPS program is terminated, replacement VOR/TACAN's will be required to meet the navigation requirements for the forseeable future. The requirement for these equipments would extend well beyond the year 2000, and for operation over this period of time, new equipment could be expected to pay for itself, by reduced maintenance costs.

The utilization of FAA VORTAC's where located in operational range of Air Bases, could significantly reduce the numbers of VOR/TACAN's to be replaced. The FAA believes a number of such arrangements are practical. Discussions with Air Force pilots confirm the reasonableness of this approach. A recent survey by the GAO identified 64 locations which appear to be candidates for common Air Force/FAA usage of FAA VORTAC's.

The decision to compete the VOR/TACAN procurement, rather than procure inventory, or in-development Government equipment was driven more by a desire to treat contractors equitably than to obtain equipment at the least cost to the Government. The least costly method appears to be to simply buy items already in Government or being developed under Government contract. Air Force procurement policy supports this position. Cost avoidances include: Documentation need not be duplicated, parts exist in a Government logistics system, training courses need not be duplicated, and a software maintenance (if applicable) capability need not be duplicated. New navigational aids require extensive testing. Such testing is not required for existing items.

Both the user, AFCC, and the procurer, ALC, attempted to obtain the required items by add-on to an on-going FAA VORTAC procurement. This effort was not supported by the Air Staff who directed procurement by competition. The Surveys and Investigation Staff believe this course of action will result in unnecessary documentation, testing, and duplication of training effort, and logistics support, as well as software maintenance effort.

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Scope of Inquiry

In the course of developing information upon which to base this report, the Surveys and Investigations Staff interviewed representatives of the Air Force Deputy Chief of Staff, Logistics and Engineering on matters concerning justification, programming and funding. The Contracting Officer, Sacramento Air Logistics Command was interviewed regarding the mechanics of the procurement process to be used. The experience and rationale employed in the on-going procurement of TACAN's by the Navy was discussed with Naval Electronic Systems Command officials. Maintenance problems and rationale for their support of a remote monitor capability was discussed with representatives of the Air Force Communications Command. Cost, operational experience, and reliability of recently procured Army fixed station VOR's, as well as the pros and cons of cross service procurement were discussed with procurement and legal representatives of the Army's Communications/Electronics Command.

Representatives of electronics firms with an interest in the TACAN/VOR/VORTAC procurement were interviewed to obtain their views regarding the pros and cons of computer driven fault analysis approaches to maintenance, the competitiveness of the current Request for Proposals, the availability of equipment to meet the stated requirement, opportunities to reduce costs, and the benefits and penalties of a consolidated procurement of TACANs/VORs/VORTAC's as opposed to procurement of individual items. Industrial organizations interviewed included: International Telephone and Telegraph; Nutley, N.J.; Wilcox Electric, Inc., Kansas City, MO; Gould Inc., NAVCOM Systems Div, El Monte, CA; E-Systems, Montek Div, Salt Lake City, UT; EDMAC Associates Inc., East Rochester, N.Y.; and Cardion, Holtsville, N.Y.

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The Air Force VORTAC Class IV B Modifications Programs

System Description

A VOR (Very High Frequency Omni-Directional Range) transmitter sends out omni-directional radio signals which in effect show 360 directions in one-degree intervals. An airborne receiver picks up the part of the signal which corresponds to the direction to the transmitter. The FAA installed VOR transmitters for civil navigation during the late 1940's and 1950's.

The military later developed and began installing TACAN (Tactical Air Navigation) at military airbases during the 1950's to provide the same directional function as VOR and a Distance Measurement Equipment (DME) not available with VOR. Like VOR, TACAN transmits omnidirectional radio signals, showing 360 directions, to high flying airplanes over 200 miles away. However, VOR and TACAN are not interoperable because they operate on different radio frequencies.

The FAA began adding DME, the distance measuring portion of TACAN, to VOR transmitters so that civil aircraft equipped with VOR receivers and DME transponders could determine direction and distance to individual transmitters. Also beginning in the 1950's, FAA colocated TACAN transmitters with VOR transmitters (called VORTAC's) so that both civil and military aircraft could determine directions and distances to the VORTAC's. Civil aircraft use VOR and the DME portion of TACAN while military aircraft use the TACAN.

These systems are used for both enroute and for terminal navigation. They may also be used for non-precision approach/ landings.

Background/History

The basic TACAN design was developed and installed in the late 1950's. The first modernization was performed in 1967 when new station monitor/control groups (Phase I) and new antennas (Phase II) were installed. Phase III modernization, new receivers/transmitters, was scheduled for 1974 but was cancelled due to funding limitations. It wasn't until September 1978 that $32.5 million 3080 money was approved by Air Force for a Phase III Fixed Base TACAN Modernization Program (Class IVC modification T-27010C). Also during this period $4 million was approved for a VOR modernization program.

The Director for Contracting and Manufacturing for Sacramento Air Logistics Center (SMALC) rejected a small business set-aside request for the Phase 3 TACAN program on September 17, 1979, due to a lack of qualified small business firms to manufacture TACANS.

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This rejection was questioned by Congress, the SBA, and several small businesses. In November 1979, the SMALC Commander overturned the decision of the contracting officer, after the SBA provided the names of two qualified small businesses. SMALC agreed to the set-aside but determined that a two-step acquisition process was required to enable firm determination of technical capability, and would allow the set-aside to be cancelled, if questionable capabilities of the small business firms were confirmed. The Assistant Secretary of the Air Force for Research, Development and Logistics assessed SMALC's decision and on January 7, 1980, by memorandum recommended the Secretary support the set-aside. During this period, the idea of a set aside was being questioned by several Congressmen and several large companies. The Secretary requested a reassessment be made to further examine the issues involved in the set-aside appeal. Visits were made to SMALC, small businesses, and FAA. However, before a decision could be made, the Commander, Air Force Communications Command (AFCC), asked that the Air Force consider linking the acquisition with an on-going FAA VORTAC development program and capitalize upon the development potential promised by that system. This request was denied by the Secretary because it would represent a sole-source acquisition of an unproven system, and would deny desirable competition.

AFCC then asked that the program be restructured to take advantage of current technological capabilities and to consolidate the TACAN program with a VOR update effort scheduled for FY 1981. An AFCC briefing on March 10, 1980, to the Air Staff and the Principal Deputy Assistant Secretary Research, Development and Logistics stated the following advantages of a restructured TACAN and VOR systems approach (VORTAC):

-- The application of current state-of-the-art technologies not available when the original Phase III modernization proposal was initiated in 1974. The most significant example is the use of microprocessor technology permitting fault detection and isolation and reporting using a Remote Maintenance Monitor. This technology is available without incurring development costs, and will help eliminate the critical manpower skill shortages facing AFCC because of the need for highly trained personnel and the difficulty in retaining quality Air Force personnel.

-- Cost savings available by eliminating 79 manpower slots for a $1 million recurring per year expense.

On April 7, 1980, the Secretary of the Air Force approved the AFLC proposal thereby cancelling the TACAN Class IVC modernization program and directed SMALC to merge the TACAN program and the VOR program and begin a new program. The new system specification, Class IVB (reliability and maintainability) was assigned and a RFP was issued October 1980 to industry for comment. Five major companies and two small firms responded with comments.

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The SBA representative at SMALC requested a small business set-aside for the new program through the contracting officer. This request was denied by SMALC, and appealed to Air Force Headquarters where the appeal was rejected.

The rejection of the set-aside reflected the unanimous agreements of the Contracting Officer, the SMALC Commander, the Air Staff, and the Air Force Office for Small and Disadvantaged Business Utilization. The rejection was based on the lack of two acceptable small businesses which is required by law to set-aside a procurement.

On May 21, 1981, SMALC issued the R&P for the VORTAC system with copies going to all interested contractors large and small. On September 4, 1981, bids were received from four large firms.

Players

The cast of characters involved in the TACAN/VORTAC story consists of large corporations, small businesses, Government agencies/departments, and Congress.

The large corporations involved throughout the history of the program have been ITT, Gould, E-Systems and Cardion, who have all produced navigational aids for the Government.

ITT has produced the AN/URN-201 TACAN (15 years old) and most recently is providing FAA a VORTAC with state-of-the-art fault detection, isolation and reporting. ITT's involvement in the Air Force TACAN/VORTAC procurement programs has been limited to offering Air Force the FAA VORTAC, commenting on the VORTAC specifications, and submitting a bid. Wilcox Electric Inc. will provide the VOR to ITT.

Gould has been very active in the navigational aid industry providing a TACAN to the Navy with limited remote operational status information, and vigorously attempting to obtain the Air Force TACAN/VORTAC contract. Goulds methods of obtaining the Air Force contact have been many and varied. When it appeared that a small business set-aside would be applied to the procurement, Gould negotiated with IES of Texas, a small minority business, to sell their TACAN. At the same time, Gould was soliciting Congressional support to reject the set-aside, and were concurrently pushing for an Air Force procurement of the Navy TACAN URN-25 (Gould produced) using a MIPR action. Once the set-aside was rejected, Gould commented on the VORTAC specifications, and issued a bid with Phillips of Canada, their subcontractor producing the VOR.

E-Systems has provided the services the AN/GRC-20 TACAN (15 years old) and the FRN-41 VOR. Many of their equipments are still in the inventory today. In an effort to compete for the TACAN/VORTAC contract, if a set-aside was approved,

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E-Systems teamed with 3dbm, a small business. Once the set-aside was rejected, E-Systems elected to operate alone and submitted a bid for the VORTAC.

Cardion, although not a manufacturer of either a TACAN or VOR, has an extensive background in the navigational aid industry, notably in the production of Distance Measuring Equipment (DME). Cardion commented on the VORTAC specifications and issued a bid.

The picture of small businesses involvement in the program is confusing. Only one small business has been identified having the capability of manufacturing a TACAN, EDMAC Industries. EDMAC has produced and sold TACAN test equipment to various foreign governments and presently has an engineering model prototype solid state TACAN transponder.

EDMAC commented on the VORTAC specifications, but did not bid on the procurement. They felt the expense of preparing a bid was not a good risk without a set-aside limiting competition to small businesses.

Congressional players included both a group who supported the set-aside, and a group who supported open competition.

Because of funding limitations and responses to various pressures, the TACAN/VORTAC procurement has experienced much delay. The program was begun in 1974, funded in 1978 and to date a contractor has not been selected.

Program Justification

The VORTAC Class IVB Modification will replace current vacuum tube equipment at Air Force fixed base VORTAC/VOR/TACAN facilities with the latest state-of-the-art, solid state equipment. The program will increase reliability, reduce maintenance costs, standardize equipment, and ensure supportability of these critical navigational aids. In addition, this modification will provide the user with a remote maintenance monitoring capability which will reduce manpower requirements. Under the remote maintenance monitoring concept, the Data Acquisition and Processing System (DAPS) will automatically perform fault isolation, collect maintenance data, and remove a beacon from service if necessary.

Program Profile

The term "modification" in the program title is misleading. All equipment in the VORTAC shelters will be replaced except the antennae and power generators. In addition to the basic VORTAC equipment, a computer, printer, and two input/output terminals are included. One termial will be used at a remote maintenance center.

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Assumption: The GPS Program Will be Completed

The procurement of new navigational aids whose functions could be provided by the Global Positioning System (GPS) defeats the basic reason for supporting that system. The rationale supporting the requests for funding this expensive system has been its capability to replace a large number of systems presently performing navigation/positioning functions. TACAN/VOR is a primary candidate for replacement by GPS. The economic viability of GPS is dependent on the early implementation of GPS and minimum investment in replaceable systems, pending full operation of GPS.

The Investigative Staff believes the least costly, most efficient way to provide TACAN/VOR service, pending availability of GPS, is a policy of repair and overhaul as required. The FAA is replacing all its VORTAC equipment. The majority of the replaced equipments are providing excellent service (99+ percent availability). The FAA will make these equipments available to DOD free, thus making available a more than ample supply of either replacement beacons or repair parts. Both the Air Force Sacramento Depot and the FAA Depot have the capability to completely overhaul these equipments for about $25,000 each. The Air Force Depot has the capability of overhauling 75 to 100 TACAN's per year on an expedited basis. Total Air Force inventory is reported as 153.

The potential for sharing FAA VORTAC's should be carefully examined in each location for which new beacons are proposed. Sixty-four of the 153 locations are in areas in which FAA facilities exist. FAA officials believe some of their facilities could provide service to adjacent military airfields. If FAA service was used where possible, the requirement would lessen in direct proportion to the number of facilities shared.

TACAN/VOR procurement is not in consonance with Congressional guidance. The DOD Appropriations Act, FY 1980 Report of the Committee on Appropriations directed DOD to follow the overhaul and repair path when possible rather than procure new TACAN's.

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Assumption: The GPS Program Will be Terminated

This action would necessitate the provision of TACAN/VOR service beyond the year 2000. Continued service over such a protracted period of time would dictate the procurement of replacement equipment. Depot overhaul experts estimate the useful life of an overhauled TACAN would average about 7 years. Thus for an operational requirement spanning over 20 years, existing equipment would require three overhauls, the cost of which would exceed the cost of procuring new equipment. Issues pertinent to the procurement of new TACAN/VOR's are:

The Navigational Capabilities to be Provided by this Program Could be Obtained by Using Equipments in Inventory, or Under Procurement by DOD and FAA.

Candidate systems are:

-- AN/URN-25 TACAN Transponder is being produced by Gould Incorporated for Navy carrier and fixed site shore stations. These 35 dual installations are priced at $283,000 each, including documentation. Six sets are presently in operation. Navy reports excellent performance. These equipments meet FAA operational criteria. Remote control is limited to about 3 miles distance and consists of providing remotely the capability to turn on/off, provide high or low power operation, or receive only operation. The remote notifies existence of a hard fail (turn off system) or a soft fail (system deteriorating). The Navy is activating maintenance courses for this equipment at both Norfolk and San Diego.

Air Staff personnel comment that if the URN-25 were procured, the program cost would be approximately $45 million, which is $18 million above program budget. The URN-25 cabinet is built for shipboard use and increases the cost, over that of an FAA type cabinet, about $6,000. The desired remote maintenance capability is not provided, and the equipment shelves are not engineered for mounting in the Air Force standard 19-inch equipment racks.

-- AN/FRN-41 VOR was produced for the Army by E-Systems. The Army initially bought 16 units for $730,000 including documentation and antennae, and subsequently bought 13 units, in 21-foot shelters for about $34,000 each. A second system to provide the desired dual system operation could be procured for an additional $15,000. These figures are 1977 dollars. A maintenance training course was established at Ft. Gordon, Georgia, which is in operation now. Army has experienced "superior reliability and maintainability" in operating these sets.

In late 1979 Air Force evaluated the FRN-41 and found the performance, maintainability, installation, and reliability were

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satisfactory. They explored the possibility of meeting their requirements by an add-on to the Army contract. The Army Communications/ Electronic Command legal office advised such a procurement was improper. In order for Army to procure VOR's for Air Force, a competitive procurement was required.

Procurement of the FRN-41 and the URN-25 would provide the basic operational capabilities to be met by the VORTAC program.

-- VOR/VORTAC replacement and modernization equipment is being produced for FAA by the IT&T. In early 1980, the AFCC requested the Air Staff consider linking the Air Force acquisitions with the FAA procurement program in order to capitalize on the development potential promised by the FAA system. The Air Staff and Secretariat rejected the request stating it would represent a sole-source acquisition for a system not yet proven, and would deny the advantages of competition among firms with the potential to fulfill the program needs.

Under the existing contract, the VORTAC unit price is approximately $85,630. This includes the VOR and TACAN transponders, a facility central processing unit, battery charger power supply, standby power inverter, and telephone dial up modem. Additional equipment required such as cables, ground check kits, remote monitor and controls and spares would all cost about $40,000 for a total installation cost of about $125,000 (spares cost $30,000). Documentation cost the FAA $1.08 million. It includes: Operators Guide, maintenance diagnostic routines, two software packages, one for VOR and one for TACAN for depot software maintenance, equipment list, and test equipment lists.

The program schedule has slipped five months due to FAA specification changes. Low rate initial production deliveries will begin in November 1981. Full production will be reached in June 1982 (35 units per month). Deliveries will be completed in July 1984. Production models of both TACAN and VOR have been under live test for over 60 days.

The FAA has identified requirements for 20 VORTACs above those contracted for. A combined Air Force/FAA buy would result in a single large procurement, thus offering the potential benefits of economy of scale. FAA documentation (FAA cost over $1.0 million) is available at no cost to the Air Force. FAA logistics support could be utilized, thus negating an Air Force requirement to enter the parts inventory into their logistics system. FAA is installing a complete test bed to be used for training personnel and to maintain software. Both functions could be performed for Air Force by FAA.

Common Air Force/FAA equipment would facilitate FAA maintenance of Air Force VORTACs in the event of an unexpected requirement for electronics specialist overseas. Fourty-three Department of Defense VORTACs are now partially or wholly operated/maintained by the FAA.

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The distance measuring equipment of the Air Force TACANs are an integrated part of the National Air Space System and are used by all aircraft equipped to operate with them. The FAA and Air Force currently are jointly operating/maintaining a national radar system. This operation is believed to be very cost effective and operationally satisfactory. A similar arrangement appears feasible for VOR/TACANs.

The Justification For the Merging of the TACAN and VOR Procurement Programs has been Questioned by Industry.

Air Force justification for merging these procurements are:

o Air Force is losing skilled senior electronics technicians required to maintain the current aging operational TACAN's and VOR's Acquiring both equipments from a single contractor, responsible for integration of the equipment where it is collocated, will provide a single system architecture, thereby alleviating the maintenance situation.

o A part of the merging action was the prescription of the use of microprocessors to continuously check circuit performance, diagnose problems, and when indicated, slowly degrade, rather than shut down, the system. The microprocessor fault diagnostics is expected to result in the use of less highly skilled technicians.

The Air Force Communications Command (AFCC) which will install, operate, and maintain the equipment, point to the planned reduction of 788 technicians by FAA which is based on the use of microprocessor technology. AFCC believes they can reduce their manpower 79 people using the same approach.

AFCC maintenance organization is presently structured around specialists trained on specific equipment. With the introduction of increasing numbers of equipments using microprocessor self diagnostics and modular repair, such as the new Scope Dial telephone switches, and tactical satellite terminals, AFCC expects to blend their specialist force into generalist categories whereby a generalist would be capable of maintaining a variety of microprocessor driven equipment.

o Capitalize on technology advances since the TACAN/VOR replacement was conceived in 1974. During the period 1974 to 1980, when the program consolidation was directed, the application of microprocessors to electronic circuitry had rapidly advanced, and during this period the telephone companies had installed remote maintenance monitoring schemes to serve remotely located microwave relays. The FAA had contracted for similar remote maintenance capabilities for a replacement VORTAC equipment. For the first time a 5 kilowatt solid state final amplifier was developed for a VOR beacon.

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Industry Claims of Unfairness

o EDMAC Associates, Incorporated, state they feel the restructured procurement effectively eliminated any small business from real contention. EDMAC does not manufacture a VOR. They are currently negotiating with IT&T to subcontract for the TACAN receiver should IT&T be the selected bidder. They have largely restricted their interest to attempting to sell the EDMAC Model 9500 TACAN Transponder. Air Force requirements beyond this basic product they describe as adding unnecessary complexity. Specifically, they pointed to the microprocessor data acquisition and processing system which they feel would increase, rather than decrease, the maintenance load, and reduce system reliability.

o The 3 dbm Manufacturing Company of Westlake Village, California, in responding to the Air Force request for industry comments on the RFP for the merged specifications, opined that the similarity of the spec to that of the FAA specification tended to limit competition. They stated the FAA currently has a contract to develop such a system as is described in the merged (VORTAC) specification.

The 3 dbm response was based on the assumption that this procurement would be "set-aside" for small business. They acknowledged that another company, E-Systems would supply both the TACAN and VOR equipment if 3dbm won the award. What contribution 3 dbm would make is unidentified.

o Gould NavCom Systems has written that they feel the specification describes the equipment being developed for FAA. As such they feel the specification is unduly restrictive and fails to maximize competitive opportunities by avoiding nonessential design features unique to any prospective offerer. The specificity denies the contractor the opportunity to implement alternative mechanizations which might better fill the requirements.

The Gould company is presently producing a Navy TACAN, the AN/URN-25. Their objections are focused around those specifications which would require major redesign of the URN-25 in order for it to meet the RFP specifications, primarily the Remote Maintenance Monitor System and the power supplies.

o The Air Staff acknowledges the FAA developed VORTAC was a model for the specification. Changes to the FAA specification reflect the deletion of unwarranted features and the addition of desired Air Force features.

Should the VORTAC Program be Categorized as a Small Business Set-Aside?

The Air Force has been indecisive on the small business set-aside question causing delays in the TACAN/VORTAC program and confusion to Congress, private industry (large and small), and other civil and government agencies. The Air Force set-aside

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decision process can be historically traced to three decisions (or non-decisions): (1) deny set-aside; (2) approve set-aside pending final Secretary approval and (3) reject set-aside.

The Defense Acquisition Regulation (DAR) 1-706.5 states that the entire amount of an individual acquisition shall be set-aside for exclusive small business participation if the contracting officer determines that there is a reasonable expectation that offers will be obtained from at least two responsible small business concerns offering the products of different small businesses and that awards will be made at reasonable prices. (Emphasis added)

The navigational aid industry is a highly technical industry composed of only a few large commpanies which produce complete equipments. They procure component and subassemblys from numerous small firms who specialize in particular parts or circuits. There are no known small businesses in the industry currently manufacturing VOR's or TACAN's. The Air Force's initial procurement strategy on the TACAN modernization program was open competition. The SBA, however, recommended a set-aside, and provided the Air Force with the names of two small businesses they believed to be responsbile, EDMAC and ALVARADIO.

Before a set-aside decision was approved, the Air Force combined their VOR and TACAN procurement (VORTAC) and asked 33 large and small businesses to comment on the VORTAC specifications. Five large corporations responded with comments, along with two small firms, EDMAC and 3dbm. EDMAC indicated they would not undertake the VORTAC program without the assistance of one or more major team partners.

3dbm's response to the VORTAC specifications was very limited and did not indicate any depth of knowledge of the requirements. 3dbm has never manufactured a TACAN or VOR and depended on larger companies to provide the VOR and TACAN which they would assemble into a system. 3dbm planned to procure both the VOR and the TACAN's through a teaming arrangement with E-Systems which was to provide these equipments.

Based on the comments, the Air Force felt EDMAC's requirement for teaming with large corporations would unnecessarily increase the cost to the government, and that 3dbm lacked expertise, would contribute nothing to the procurement, and would incur an additional cost. Therefore, the set-aside was not applied.

The Air Force decision to allow open competition rather than a small business set-aside, was based on the lack of qualified small businesses. Opening the procurement to all businesses would provide equitable consideration of all bidders and hopefully result in the lowest price to the Government. Open competition does not exclude small businesses. In fact, the Air Force has encouraged small business to bid on the VORTAC RFP issued May 1981. The results of that RFP bidding further emphasizes small

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business inability to provide a VORTAC system. Four bids were received, all from large corporations. No small business submitted a bid.

This does not exclude small business from participating in the VORTAC procurement. The navigational aid industry is highly specialized with no one company having the ability to produce the entire VORTAC system. An opportunity exists for small businesses with an electronic/navigational aid background to subcontract to the winning bidder to provide parts, circuits, or assemblies which they may have a particular expertise in producing. EDMAC, in fact, has been negotiating with ITT for a subcontracting role.

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Observations

The Intensity of Competition and Lobbying for the Air Force VORTAC Procurement is Driven By a Much Larger Potential Market.

The entire worlds VOR/TACAN systems were installed in approximately the same time period. The increased maintenance requirements and gradual deterioration of reliability experienced with U.S. equipment is beginning to be experienced by other countries. Industry feels the U.S. has been a leader in world Air Navigation Systems and foreign countries will be influenced in their replacement planning by U.S. Government actions, particularly the Air Force. Industry representatives who displayed their equipment at the 1981 Paris Air Show, reported the Europeans appeared to assign considerable weight to the assignment, or lack of, a joint Army-Navy nomenclature to an equipment. They were aware of the extensive evaluations and testing which precede the nomenclature assignments. The minimum estimate of the value of the potential foreign market, provided by industry, is $125 million, the high estimate was $200 million.

The Numbers of Equipments Required is Not Certain.

If the GPS program is supported, and procedes on schedule, existing VOR's/TACAN's, could be overhauled or replaced with parts or entire beacons from the 700 equipments being replaced by the FAA. To replace existing VOR's/TACAN's with new equipment, to fill the operational requirement during the interim period awaiting GPS operation, now scheduled for FY 1987, appears extravagant. Air Force plans to eventually phase out TACAN's and replace them with GPS. How quickly the change-over takes place is a matter of priorities assigned.

FAA VORTAC's, located within operational distance of proposed Air Force VOR/TACAN replacement sites, exist in over 60 locations. Both FAA and some Air Force pilots believe the FAA facilities could, in many locations, serve Air Force requirements on adjacent air bases. Until the number of locations where joint usage of FAA facilities is feasible is determined, the number of new equipments required will be subject to question.

The Requirements to Be Met By This Program Can Be Met With Existing Inventory Equipment, or Equipment Now Under Development for the Government.

-- The Navy AN/URN-25 TACAN being built by Gould, together with the Army AN/FRN-41 VOR, produced by E-Systems, would provide the basic functions required. Operational and maintenance training

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could be provided at existing or planned Navy TACAN and Army VOR courses. Army and Navy logistics systems could be utilized to support the equipment. Existing documentation (manuals, parts lists, etc.) could be utilized.

Such an approach would not provide the computer driven fault diagnosis expected to reduce the numbers of maintenance men and skill levels currently required. Further, to train personnel on these equipments would entail sending them to the Navy for TACAN, then to the Army for VOR, or establishing a new Air Force training capability on both equipments.

-- The FAA has a procurement program for both VOR's and VORTAC's. These requirements embody the latest state-of-the-art, and employ microprocessor driven fault diagnosis which can be remoted any distance. The Air Force RFP was patterned on the specifications for these equipments in order to capitalize on the work already done by the FAA. Based on current contract and latest contract prices, the least costly alternative to meet the Air Force requirement is to procure these equipments by an add-on to the present FAA contract. This action was recommended by the AFCC, which is the command which will operate and maintain the sets. The recommendation was rejected by the Air Staff. The benefits of procurement through a contact add-on are: Documentation is paid for, Air Force need only reproduce it. Both the equipment and facility to train operations/maintenance men, as well as maintaining software, are to be provided by FAA, which is willing to perform those services for the Air Force. Further, should the Air Force specialist program further deteriorate, FAA could assume the responsibility for operating and maintaining the Air Force beacons. Forty-three of the DOD beacons are currently being supported one way or another by the FAA.

The RFP Will Not Permit the Procurement of the Equipment Required to Provide VOR/TACAN Service at the Least Cost to the Government.

The basis for this belief are:

-- Procurement of items in Government inventory, or being developed under Government contract, is less expensive than modification of existing items or new developments. This belief is substantiated by procurement policy promulgated in AFSC/AFLC 800-31 section 3B(2).

-- Technical specifications in the RFP deny industry the opportunity to use it's ingenuity to reduce costs or improve efficiency of the system being produced.

-- Industry is denied the opportunity to bid existing products. If they did so, their bids would be "technically unresponsive", even if their product could provide the basic service required at the least cost.

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-- A unique specification will negate the opportunity to avoid documentation, testing, and training costs which a new equipment must incur.

The Air Force Has Been More Concerned Over Industry Pressures Than the Cost to the U.S. Taxpayers.

The Air Force procurement programs for the VOR, TACAN and VORTAC have taken several different procurement forms - open competition, small business set-aside, MIPR action and finally a return to open competition. All of these methods were considered as a result of industry pressures.

The actions of the Air Force can best be described as a damned if you do, and damned if you don't, situation. The original TACAN procurement was scheduled for open competition which was challenged by SBA and the small business community. Bending to this pressure the TACAN contracting officer and the Assistant Secretary of the Air Force, Research, Development and Logistics approved a set-aside pending Secretarial support. Before the set-aside decision could be made, the Air Force, based on countering pressures from large firms, considered the possibility of procuring the Navy's Gould URM-25 TACAN, E-Systems FRM-41, or the FAA's ITT VORTAC using MIPR actions. The ITT VORTAC system was highly regarded by the Commander, Air Force Communications Command who felt that linking the acquisition with the on-going FAA program would capitalize upon the development potential promised by the ITT system. A MIPR action request was rejected by the Air Staff however, because of pressure from Industry to have free and open competition.

An Air Force proposed MIPR action to acquire the AN/FRM-41 Army VOR (manufactured by E-Systems) was rejected by the Army Legal Staff, because they felt it would be improper to MIPR and avoid open competition.

According to a high ranking Air Force official who has been privy to the VOR/TACAN/VORTAC procurement decisions, Air Force has operated as equity providers during this procurement rather than procuring at the least cost to the Government.

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PROPOSED REACTIVATION OF NAVY WARSHIPS

The Navy has proposed reactivating the aircraft carrier, ORISKANY, and four IOWA Class battleships. The reactivations were not included as an item in the budget package submitted to the Congress, but were to be considered as an "add on," and not in place of any planned fleet improvement or construction programs. Funds have been requested in the 1981 supplemental and the revised 1982 budget.

In 1980, the Investigative Staff reported the Navy cost estimates for the reactivations, in constant FY 1980 dollars, were over $1.4 billion. The ORISKANY estimate was $290 million, and the four battleships were estimated at $1.13 billion. Personnel, and Operations and Maintenance, through FY 1985 were estimated at more than $1.3 billion, for a total program cost in excess of $2.7 billion. These cost estimates are tentative and are at best, only plus or minus 40 percent preliminary approximations. "Better" estimates, the 1981/1982 budgets, call for $503 million for the ORISKANY and more than $250 million for the NEW JERSEY. (It is noted tht recent testimony by a Navy official showed the cost for the NEW JERSEY to be $336 million.)

Because of the time required to do all of the advance planning, testing, inspecting, etc., it will be 1 to 2 years after the reactivation decision is finalized and the configuration set before the physical work can begin at a shipyard. The physical reactivation work will require another 2 to 3 years after the planning is complete.

Adding many hundreds of thousands of man-days of reactivation effort on top of an already overcommitted public shipyard overhaul workload will create a large number of potential problems. Doubts exist about the capacity of shipyards to perform the reactivations in addition to scheduled overhaul work. Skilled workers may not be available to augment the work force. Ship crews are not available to peform the advance inspections and other work normally conducted before the overhauls begin. Changing schedules, reassigning ships to different yards, slipping schedules, etc., can cause significant diffulties and can lead to further problems in effective performance of any reactivation or overhaul work.

The Investigative Staff believes the total cost of the reactivations will be significantly greater than the estimates prepared by the Navy. However, a realistic assessment of the total cost cannot be made until the configurations of the ships are determined.

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Because of the ORISKANY deterioration, deck size limitations, nonavailability of aircraft, modernization needs, day-only aircraft capabilities, equipment shortages, and personnel training and retention difficulties, the Investigative Staff recommends that the Committee not fund the ORISKANY reactivation.

The Investigative Staff recommends that the Committee should consider not funding the entire NEW JERSEY reactivation cost until such time as the Navy has completed sufficient planning to enable a more informed decision on the configuration, scope of work, and the effects on other ship overhauls.

Based upon follow-up, interviews with CNO officials in March 1981, the Investigative Staff believes that most of the problems that were raised in last years report still exist. Most important, the questions about WHERE the work is to be done, and the impact upon the overhaul schedules for existing fleet ships, do NOT appear to have been resolved. Further, if a large ship construction program is going to be started within the next year there is considerable doubt as to whether sufficient industrial base capability exists--public and private--to do all the repair/overhaul work that is currently scheduled, plus new construction, plus the battleship and ORISKANY reactivations--in the time frame proposed.

USE

The above information was provided to the Secretary of Defense during the subcommittee's hearings on the FY 1982 Defense Appropriation request. The Secretary's response for the record follows.

RESPONSE

During the last reactivation of BB-62 in 1966-67 a total of approximately 260,000 mandays of direct labor was accomplished in a period of 10 1/2 months. The preplanning and design phase for that reactivation was approximately 6 months. The current program planning period is also 6 months. Some concurrency of design and industrial work can be expected, but should not cause an adverse impact on the industrial schedule.

The Navy is currently investigating accomplishing the reactivation of the ORISKANY and the battleships in both private and public sectors. The final decision to use public or private resources will depend on the assessment of relative cost and schedule risks. Major factors will be the Naval shipyard ceiling and current scheduled workload.

The shipbuilding industry, public and private, does have sufficient industrial capacity to support an expanded shipbuilding program including the reactivations. It will require the proper utilization of those resources that are specialized or limited. I am confident that we can do this.

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TEN TON M.A.N. TRUCK

In a letter to the Secretary of Defense dated January 20, 1981, the Logistic Management institute (LMI), a nonprofit corporation established 20 years ago to serve as logistics advisor to OSD, expressed concern regarding contractor support and maintenance contracts. LMI stated, "Two changes have acted together to make it difficult to keep our defense systems and equipment in working order. Items to be maintained have become much more complex. Simultaniously, the mix of military maintenance personnel has shifted toward the low side with respect to both experience and skill level." LMI went on to say, "The consequences are as might be expected: low readiness ratings, heavy backlogs, long work weeks, extraordinary supply procedures, and much contracting out." (emphasis added)

A DOD directive requires the Military Departments to achieve self-sufficiency in maintaining and operating new systems as early as possible. In practice, the Military Departments need contractor support on a continuing basis--frequently throughout the operational life of systems. Systems managers, faced with a choice between sacrificing readiness or violating the DOD Directive, frequently opt for the latter. In this regard, LMI stated, "The DOD plans for war on the basis of self-sufficiency--combat support activities performing direct maintenance; it operates using contract civilians who cannot be compelled to perform any function in direct support of forces engaged in conflict. It cannot have it both ways."

An example of a piece of equipment currently being procured by DOD which will require contractor support and maintenance for its entire 20-year life span in the DOD inventory is the sole-source-procured, German M.A.N. 10-ton truck. The FY 1980 Other Procurement Air Force appropriation, subsequent reprogramming of FY 1980 Army funds, and the FY 1981 Other Procurement Air Force and Army appropriations contain $13.6 million for the purchase of 60 of these vehicles. On October 30-31, 1980, a contract was let for 15 M.A.N. vehicles with an option to purchase 450 more.

According to testimony during the FY 1981 hearings on the Defense budget by Dr. Percy Pierre, Assistant Secretary of the Army for Research, Development and Acquisition, and Major General Louis C. Wagner, Director of Combat Service Support Systems, Office of the Deputy Chief of Staff for Research, Development and Acquisition among others, 465 of the M.A.N. vehicles, at a unit program cost of between $215,000-$245,000 are urgently required to support the Army's Pershing II and the Air Force's Ground Launched Cruise Missile (GLCM). Both of these systems are currently in development and will ultimately be deployed to Europe as part of the theater nuclear force. As a consequence of this stated urgency neither the Army nor the Air Force can wait for

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the production of the 10-ton, Heavy Expanded Mobility Tactical Truck (HEMTT). DOD plans to procure competitively and deploy, worldwide (between FY's 1981 and 1988) a total of 2,689 HEMTT's at a cost of $548.9 million in FY 1981 dollars.

According to DOD testimony, the logistics support plan for the M.A.N. truck envisions that Depot Maintenance and General Support will be provided under contract by the M.A.N. company. The M.A.N. organization will also provide initial training for organizational and direct support personnel; a plan of instruction for sustained training to be implemented by USAREUR: assistance in management of repair parts and major assemblies; and translated commercial manuals.

The total life-cycle cost of the M.A.N. program is estimated by DOD at $632,730,000 for 465 trucks or $1,360,700 per vehicle in FY 1981 dollars.

In reponse to questions from the Committee concerning the adviseability of procuring the M.A.N. 10-ton for use in Europe in light of the impending HEMTT procurement, Dr. Pierre stated, "Given our current situation, I think it makes a lot of sense to do what we are doing. To have two different kinds of 10-ton trucks in Europe is not a horrendous burden. It is not what we would prefer, but it's something that's acceptable. It is acceptable to the user, to the Pershing II project manager in particular. His priorities are to get his system tested and in the field on time." (emphasis added) In support of Dr. Pierre, General Wagner stated, "I think with the urgency of Pershing II and GLCM it is the only way we can go."

This situation is viewed with concern which is based not only to the obvious readiness and cost implications of such an undertaking but also as a consequence the tenacity with which DOD appears to be pursuing the procurement of the M.A.N. vehicle. For example: (1) During the FY 1979 hearings, $5.1 million were requested to procure 50 10-ton M.A.N. vehicles. The requirement for this request was based on USAREUR's conventional ammunition transportation shortfall. The Committee denied this request based on the lack of a documented Army requirement for a truck in the 10-ton weight class; (2) again, during the FY 1980 hearings $23.1 million were requested for the procurement of 151 M.A.N. 10-ton trucks. The primary requirement during this presentation was the support of the Army's Ground Support Rocket System (GSRS) in addition to augmentation of conventional ammunition movement capability in Europe.

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Internal Army documents obtained in February 1979 by the Investigative Staff (Dr. Pierre's representations during the FY 1981 hearings on this subject aside) clearly indicated the M.A.N. 10-ton had been selected by the GSRS Project Manager as the Army's vehicle of choice for the GSRS. The following chart sets forth the Army's planned procurement of the M.A.N. 10-ton as an adjunct to the GSRS program.

Fiscal Year	Appropriation	($Millions)	Quantity
1980 ----	OPA	$23.1	151
1981 ----	Missiles	16.4	72
1982 ----	Missiles	21.5	100
1983 ----	Missiles	21.6	100
1984 ----	Missiles	33.1	150
1985 ----	Missiles	22.0	97

At the time of the FY 1980 request the Army still had only a draft "Required Operational Capability" (ROC) document for a truck in the 10-ton weight class. Again, the Committee denied this funding request, citing concerns similar to those expressed the previous year and stated "this program is not in accordance with normal testing and procurement procedures and requirements."

As the Investigative Staff stated in memo on February 15, 1979, regarding 10-ton trucks; for whatever reason, DOD has chosen to circumvent the approved Office of Management and Budget equipment designation process in this instance. It appears they have devised their own solution (the M.A.N. 10-ton truck) and are attempting to develop a requirement which will support its procurement.

USE

The above information was provided to the Secretary of Defense for comment at the time of his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following response for the record.

RESPONSE

"The U.S. Army and U.S. Air Force first established 10-ton truck requirements in a Joint Service Operating Requirement (JSOR) approved on 18 March 1980. A dual acquisition strategy to meet the requirements was developed as follows subsequent to the JSOR approval: (1) The Heavy Expanded Mobility Tactical Truck (HEMTT) family has been selected to satisfy worldwide requirements; (2) the procurement of 10-ton M.A.N. trucks is to support the Theater nuclear Modernization program (Pershing II and Ground Launched Cruise missile Programs).

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Plans for sole source procurement of approximately 465 each M.A.N. trucks was based on the following factors: (1) Urgency--Procurement required to support Engineering Systems Tests and fielding requirements of Pershing II and Ground Launched Cruise missiles; (2) Standardization--This vehicle is a derivative of the family of vehicles used by the German Army; (3) Procurement Stategy--Procurement would proceed in two stages: procure 15 trucks for systems tests; then exercise option for the remaining requirment.

The DOD guidance with respect to the use of contract sources to meet defense maintenance needs is that, in so far as possible, the DOD will be self sufficient in providing maintenance support below depot level; i.e., at the organizational, direct and general level: (1) Self-suficiency in maintaining and operating HEMTT vehicles will be achieved when deployed; (2) the M.A.N. vehicles will be deployed in the European Theater with the Pershing II and GLCM systems. Organizational and direct support maintenance for these vehicles will be performed by uniformed service personnel of the Army and Air Force. Higher levels of support (general and depot) are to be provided on a contract basis with M.A.N. Negotiations and ongoing with the German government which include assurances for such continued support in wartime contingencies."

COMMENT

Issue is not taken with the statement that the Army and the Air Force first established 10-ton truck requirements in a JSOR approved on March 18, 1980. The information initially provided effectively established that the Committee denied funding for the M.A.N. 10-ton in FY's 1979 and 1980 because no such documented requirement was in existance. What is not addressed in the DOD response is the rationale behind the continually changing, stated need for this particular vehicle. In the absence of explanation, it can only be concluded that DOD simply wanted the M.A.N. 10-ton and finally was able to devise a requirement document that supported its purcurement.

With respect to DOD representations concerning the use of contractor support for fielded systems, it is suggested that the response actually begs the question. That self-sufficiency will be achieved with the HEMTT when it is deployed, was never questioned, at issue is the wisdom and cost effectiveness of relying on a contractor, particularly a foreign one, for the maintenance of vehicles that transport two vitally important weapons systems. Moreover, organizational and direct support maintenance are ultimately only as effective as the next higher echelons of support that back them up and in this particular situation these are unknown quantities. In regard to the provision of such support during wartime contingencies, it is well known that there is a clause in the constitution of the FRG which prohibits the use of German civilians in or adjacent to a combat zone. To the extent that this clause can be overcome or amended then the support plan maybe feasable; however, such an eventuality is considered highly unlikely.

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DOD'S EFFORT TO REALIGN MANAGEMENT OF CONSUMABLE SPARES

Estimated annual savings of between $73 million and $124 million could be accomplished if management of consumable items were transferred from the military service to DLA. The Investigative Staff has determined that in December 1978, OSD sent a document to the Joint Chiefs of Staff and the military departments which proposed that the management of all consumable items now managed by those departments be transferred to the Defense Logistics Agency (DLA). (The term "consumable item" encompasses (1) expendable items; items, including minor spare parts which are either consumed in use or discarded when no longer serviceable, and (2) field level reparables; items repaired or condemned in the field, rather than items returned for repair at depot level.) Based on the OSD proposed consolidation of the management of consumable items, an annual savings of $124 million in direct costs could be realized.

The Joint Chiefs of Staff and the military departments responded negatively to the OSD proposal. The Joint Chiefs of Staff did not concur and the military departments submitted their own cost estimate claiming no savings would result from such a consolidation, along with other rationale directed at envisioned management problems. The military departments claimed they were managing the items proposed for consolidation at a cost of only $88.5 million; whereas the OSD proposal had indicated that the costs to the military departments for management of the same items amounted to $242.9 million, or a difference of $154.4 million.

The OSD then requested the Defense Audit Service (DAS) to review the Joint Chiefs of Staff and the military departments responses to its December 1978 proposal. The results of the DAS effort indicated that the military departments had understated their costs by about $37 million. The report estimated that the direct costs being incurred by the military departments were approximately $125.5 million and that the direct costs which would be experienced by DLA for management of the consumable items proposed for transfer would be approximately $52.3 million. Therefore, based on the results of the DAS review, the annual savings in direct costs would be about $73.2 million. In addition to these direct costs which could be saved, ther could be additional savings in related overhead or general and administrative expenses estimated at 15 percent or approximately another $10 million for an estimated total annusl savings of about $83 million.

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In addition to the lower costs for management claimed by the military departments, they also offered comments on the technical complexity of some of the items proposed for transfer and their associated management difficulties as well as comments on the supply support to customers and its effect on military readiness. Although DAS agreed that some of the items were technically complex, this is not synonymous with complexity of management. Their review indicated that all but one of the items to be transferred were within the capability of current DLA systems and procedures. DAS also found that there were both favorable and unfavorable factors that deserved attention in carrying out the proposed consolidation of management for all consumable items. For example, DLA supply availability (the ability to satisfy a request from available stocks) is 8 to 15 percent better than the military departments; however, DLA on-time-deliveries in CONUS ranked below the Air Force and the Navy, whereas its overseas on-time-delivery rate was higher than all of the military departments.

There are a number of management considerations that deserve attention and emphasis in accomplishing the proposal to transfer management of 1.3 million consumable items from the military departments to DLA. However, in view of the magnitude of the estimated annual savings in direct costs of between $73 million and $124 million, and in view of the Secretary of Defense legal responsibility to "take appropriate action (including transfer, reassignment, consolidation or abolition of any function power or duty) to provide more effective, efficient and economical administration and operation and to eliminate duplication in the Department of Defense;" it appears that the proposed realignment of management for consumable items should be directd for implementation without further study or delay.

USE

The above information was provided to the Secretary of Defense for comment at the time of his appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request.

RESPONSE

The Secretary responded that in June 1980 the proposal was forwarded by the Deputy Secretary of Defense to the Military Services for review and comment. The Services stated certain reservations with regard to the proposal.

The Office of the Secretary of Defense is currently briefing members of the administration on this subject and is working toward resolution of this matter.

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RETAIL INVENTORY MANAGEMENT

GAO reported to the Secretary of Defense in November 1975 that the Army could save tens of millions of dollars annually through improved management of inventories at installations and divisions. Although corrective action was promised, GAO found in a current review that the Army has made little progress in resolving the previously disclosed problems and that opportunities still exist for savings of $126 million. For example, GAO found that:

-- Retail supply activities continue to hold for prolonged periods tens of millions of dollars of stock excesses which are critically needed elsewhere.

-- Supply activities annually lose visibility and thus control over the prompt recovery of tens of millions of dollars of inoperable but economically repairable items.

-- Supply activities overstate stock requirements and inflate budget requests for procurement funds and spending authority by millions of dollars annually because of inaccuracies in order shiptime, inventory record, and material demand data used in requirements computations.

USE

The Secretary of Defense was asked to respond to the above issue during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was provided for the record.

RESPONSE

Retail Inventory Management

The Army has initiated several corrective actions to address the recommendations made by GAO. With respect to the findings that retail supply activities continue to hold excess stocks which are critically needed elsewhere, the Army has received approval from the Office of the Secretary of Defense to lower the retention limit for item stockage from 3 years to 1. This revision in policy was authorized in January 1981 and will be implemented over an 18-month period to preclude inundating the wholesale system with excesses that could result in premature disposal.

The Army recognizes the importance of developing a system to monitor the performance of the retail system regarding the return of inoperable, but economically reparable items to the wholesale system. This recognition led to the development, during calendar year 1980, of the Logistics Intelligence File (LIF) Retrograde

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Intransit Visibility System that evaluates the processing of retrograde to CONUS depots and measures returns against requisition rates for reparable items. By gaining visibility over the reporting, turn-in, and disposition of reparable items, the Army now has the ability to pinpoint those Commands which have low return rates and are thus better able to initiate appropriate corrective action.

Other programs such as the Selected item management System--Expanded, the Automatic Return Item list, and the Materiel Returns Program have also been implemented by the Army and will help to improve the visibility and control of assets for intensively managed items.

The extension of the Army's Direct Support Unit Standard Supply System (DS4) will provide the division level with the capability to compute and periodically update the Order/Ship Time (OST) for each item on the Authorized Stockage List. As an interim measure, until activities become operational under DS4, direction has been given whereby the Direct Supply Support Activity Performance Report distributed by the DARCOM Logistics Control Activity will be used as the source for update of the OST.

To correct the problem of stock records possibly reflecting a negative balance, the Army has developed a procedural change which will be broadcast in May/June 1981 that will result in the initiation of a special inventory when an unusual asset position is experienced. Other known problems with inventory procedures were corrected in April 1980 with implementation of a System Change Package in the Standard Army intermediate Level System (SAILS). In addition, an Army message issued in February 1981 requires that physical inventory adjustments be made promptly upon completion of the physical inventory and acceptance by the Accountable Officer.

As indicated by the GAO Report, the Division Logistics Supply System (DLOGS), in some instances, erroneously changes the demand codes on requisitions from nonrecurring to recurring, thus significantly affecting the requirements computation process. This condition is recognized by the Army and a Systems Change Request has been developed that will result in the appropriate corrective action.

We believe that the above actions on the part of the Army adequately address the findings contained in the GAO Report and will result in significant improvements in Army inventory management.

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DOD CONTRACTING FOR CONSULTING SERVICES, MANAGEMENT SUPPORT AND PROFESSIONAL SERVICES

The Investigative Staff has recently received and developed information that shows that serious and pervasive problems relating to contracting for professional services have existed a least for the past 20 years. Without vigorous and prompt management attention, these problems continue to afford increased opportunities for excessive, unnecessary, and improper use of such contract services.

Within the past year there have been several significant and critical reports on the use of professional service contracts by the Investigative Staff, the Defense Audit Service, The General Accounting Office, and others. Although each of these reports addressed different segments within the broad definition of professional service contracts, each one included essentially the same weaknesses.

The criticisms touch on the problem of unsolicited proposals present in almost half of the contracts; use of sole-source awards in about two-thirds of the cases; the potential for conflicts of interest since about half of the awards went to former DOD employees; apparent loss of in-house expertise evidenced by contracting for work that should be done by DOD in-house personnel or failure to adequately consider available in-house capability and the inability of DOD to enforce sound procurement practices and exercise effective management control over the contracting for these management type services.

In FY 1979, it is estimated that DOD spent about $1.6 billion on all types of professional service contracts. This estimate of 1979 expenditures cannot be verified. For example, DOD was unable to totally identify contracts for consulting services as defined by OMB. According to DOD, this difficulty was mainly attributable to the lack of uniform interpretation by the DOD components as to what constituted a contract for consulting services. Thus, no one really knows how much of DOD's budget is spent on such contract services. The proposed DODS budget requests undoubtedly will result in increased expenditures for professional contract services and additional opportunities for abuse.

Prompt remedial action by DOD is critical to minimize the potential for waste and mismanagement in contracting for professional services.

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USE

The above information was presented to the Secretary of Defense at the time of his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply for the record.

RESPONSE

In September 1980 the Military Departments and Defense Agencies were directed to establish improved management controls over the acquisition process for consultant services, studies and analyses, and professional and management support. This direction resulted from OMB Circular A-120, Guidelines for the Use of Consulting Services, and a July 2, 1980, OMB letter governing Management Control and Consulting Service Contracts and Improvement of Agency procurement practices. We expanded upon those OMB directives in our Departmental guidance because we perceived that the President and the Congress are concerned not only about consulting services, but about studies and management support service contracts as well.

In addition, we are currently preparing a new DOD Directive on the management of Studies to replace the existing one. A key feature of this new Directive is the establishment of a Coordinator of DOD Studies, whose primary function will be to serve as a focal point for studies in the Department, a source for the issuance of guidance concerning the management and control of studies, and a coordinator of activities related to studies use and management throughout the Defense Department.

Collectively, we believe these actions, along with the development by the OSD (Comptroller) of a Special Exhibit (PB-21) entitled, Special Analyses Consultants, Studies and Analysis, and Management Support Contracts, will futher improve our management and control of studies and consulting service contracts. The Special Exhibit clearly portrays for management and Congress the budget costs for consulting and related services for the various DOD appropriations.

It is our basic policy, as stated in the Defense Acquisition Regulation (DAR) and elsewhere, to competitively award all contracts whenever possible. Pursuant thereto, contracts for consulting and other service contracts are competitively awarded to the maximum extent practicable.

Our policy as to unsolicited proposals is covered in the DAR. As stated therein, we recognize that an unsolicited proposal is a valuable means by which unique or innovative methods or approaches that have originated or been developed outside the Government can be made available to Government agencies for use in the accomplishments of their missions. However, the DAR goes on to state that a favorable

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Comprehensive evaluation of an unsolicited proposal is not, in itself, sufficient justification for negotiating on a noncompetitive basis with the offeror.

Regarding possible conflicts of interest, DOD Directive 5500.7, Standards of Conduct, in addition to citing the various statutory prohibitions that apply to DOD personnel conduct, states, among other matters, that DOD personnel shall avoid any action that might result in or reasonably be expected to create the appearance of giving preferential treatment to any person or entity. It goes on to state that DOD personnel shall not knowingly deal on behalf of the Government with present or former military civilian Government personnel whose participation in the transaction would be in violation of a statute, regulation, or policy set forth in the Directive. It should be noted, however, that former Government personnel provide a source of expertise that should not be overlooked. These personnel often seek employment with firms to utilize their experience. It would be to the Government's benefit to take advantage of their expertise as long as contracts are properly awarded and their responsibilities and conduct conform to statutory provisions and implementing regulations.

OMB Circular A-76 and the DOD implementing regulations, DOD Directive 4100.15, Commercial and Industrial Type Activities, and DOD Instruction 4100.33, Operation of Commercial and Industrial Type Activities, state that governmental functions shall be performed by Government personnel. Furthermore, A-76 specifically exempts governmental functions from inclusion in both the inventory of commercial and industrial type activities and from consideration for performance by contract under provisions of that Circular. The first step in the decision process is to determine if any existing in-house activity is a governmental function. If the answer is yes, the activity stays in-house and is not inventoried for future review.

COMMENT

The OSD response references policies, directives, and implementing regulations, as well as OMB Circulars, which seem to adequately cover the cited contracting weaknesses. The response is silent, however, on whether actions have been taken to inform top DOD management how well these standards are followed and whether corrections have been made where appropriate.

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NAVY ADVANCE PROCUREMENT

The Defense Production Act of 1950 authorizes the President to require that contracts or orders relating to certain approved defense or energy programs be accepted and performed on a preferential or priority basis over all other contracts or orders. One of the primary goals of the priorities and allocations system is to assure the timely availability of the necessary industrial resources to meet current National defense requirements.

There are two types of priority ratings--DO ratings and DX ratings. All DO ratings have equal preferential value and DO rated orders take precedence over unrated orders already accepted by a supplier. All DX ratings have equal preferential value, but DX rated orders take precedence over DO rated orders, as well as unrated orders.

The Investigative Staff found that the administration of the priority system could be made more effective in achieving the goal of timely availability of resources to meet Defense requirements. The priority system is cumbersome and contractors have little confidence in the system to help resolve long lead time problems and have in effect accepted quoted lead time from suppliers without utilizing the priority system.

The DOD should recognize that timely availability of resources, and access to productive capacity have the effect of reducing the ever increasing need for larger amounts of advance procurement funds to meet long lead times which in part are generated by unrated commercial orders. Moreover because of the increasing lead times, contractors are frequently required to make company commitments for long lead items prior to the execution of a rated contract in order to meet anticipated delivery schedules. Under current regulations the Government can only assign priority rating on a contract or order that is executed, consequently commitments made by the company prior to the contracts are unrated and the order must fall in line with all unrated orders. Proposals for revising the regulations are looking to administratively authroizing an agency to assign a rating to be utilized on orders placed by industry in anticipation of the execution of the rated contract.

USE

The above information was provided to the Secretary of Defense at the time of his appearance before the Subcommittee to discuss the Defense Appropriation request. The Secretary's response for the record follows.

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RESPONSE

The Navy agrees that improved procedures could be implemented to make the DOD priorities system more effective. This is particularly true in cases where contractors need to place material orders prior to receipt of a Navy contract. In these instances, the orders are currently placed without a DOD priority rating and, accordingly, fall in line with all other unrated orders. Establishment of a system that would allow assignment of priorities to a contractor prior to signing a contract will undoubtedly help reduce material lead times.

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FULL FUNDING VS. ADVANCE PROCUREMENT

It is the general policy of DOD to fully fund procurements such as aircraft, ships, and missiles which are covered within the Procurement Title of the yearly appropriation act.

The objective of the policy is to provide Congress and the public with a clear understanding and knowledge at the initiation of a project of the full dimensions and cost of a given item when first presented for an appropriation. In addition, the basis of the policy is to ensure that the action of one Congress does not commit a successor Congress to appropriate funds to continue a program that has been initiated in a prior fiscal year.

An exception to the general policy to fully fund procurement permits the procurement of long leadtime components in advance of the fiscal year in which the related item is fully funded. Congressional intent is for the technique of advance procurement to be well defined and narrowly applied exception to a general rule.

Congressional direction in House Report No. 93-662, dated November 26, 1973, listed three criterions for the use of advance procurement.

(1) The components have a leadtime significantly longer than the rest of the components which comprise the end item.

(2) There is a demonstrable requirement for these components even if the subsequent year's buy of the intended end items is not authorized and appropriated.

(3) The components are to be procured as Government furnished equipment (GFE) rather than a part of the end prime contractor's effort (contractor furnished equipment--CFE).

DOD though cognizant of Congressional interest in this matter construed that their earlier directive substantially encompassed Congressional concerns and did not revise existing regulations. Thus, differences remain concerning (1) the applicability of the components for spares or other purposes in the event the program fails to materialize and (2) the need to restrict components to Government furnished equipment and not contractor furnished equipment.

In its review the Investigative Staff found that the concept of full funding is being eroded and advance procurement is being abused as a result of Defense Department procurement

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of goods and services that do not meet the criteria for advance procurement set forth by the Congress nor the criteria of its own policy. Specifically, the Investigative Staff found instances where advance funding was being used for:

(1) procurements that do not have utility for spares or for which there are other demonstrable requirements,

(2) procurements of CFE in addition to GFE, and

(3) procurements of tooling and software preliminary to full-scale production which would be difficult to construe as components.

The effect of including tooling, software, and preproduction costs in advance procurement is to increase sunk costs prior to full funding authorization by the Congress thereby tending to comment future Congresses to the program. In addition, to the extent that funds are devoted to these efforts, less funds are available for long leadtime components.

USE

The Secretary of Defense was provided the above information at the time he appeared before the Subcommittee to discuss the Defense Appropriation request. The Secretary's response for the record follows.

RESPONSE

The point made is that the Navy is using advance procurement funds for items that do not meet established Congressional criteria for items funded as advance procurement. The specific points addressed are use of advance procurement funds for the following:

(1) procurement that do not have utility for spares or for which there are other demonstrable requirements,

(2) procurements of CFE (Contractor Furnished Equipment) in addition to GFE (Government Furnished Equipment), and

(3) procurements of tooling and software, preliminary to full scale production, which would be difficult to construe as components.

The report states that, since the Navy funds these items from advance procurement funds, the full funding concept is being eroded. In addition, funding of tooling and software tends to increase such costs prior to full authorization and thereby tends to commit future congresses to the program.

The Navy does not agree with any of the above conclusions. The following comments are offered:

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Navy Advance Procurement funds are in accordance with the latest OSD policy guidance on the above points.

OSD policy requires that consideration be given to the applicability of advance procured items to other programs or as spares.

OSD policy, as amended on 10 November 1980, gives full recognition of the need to fund both CFE and GFE items in the advance procurement request.

Funding of both tooling and software costs in an A.P. line is proper, providing the lead time needed to produce the tool or software is significantly longer than the related end item.

The full funding concept is not being eroded. All requests for advance procurement funds are accompanied by Procurement Data Sheets, which clearly display the expected full cost of the program for which A.P. funds are being requested.

COMMENT

The Secretary's response is not responsive to the Investigative Staff's position that the Navy is using advance procurement funds for items that do not meet established Congressional criteria.

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CONTRACTOR ENGINEERING AND TECHNICAL SERVICES

The Investigative Staff conducted a preliminary survey of DOD use of Contractor Engineering and Technical Services (CETS) contracts. This survey disclosed, operational reliance on CETS personnel (contractors) has reached the point that Navy air wings, and to some extent the Tactical Air Command (TAC) do not have the capability to operate at full combat mission readiness without civilian contractual support.

At the present time, the tempo of Navy carrier operations, like those in the Indian Ocean, are possible because CETS personnel are on board the carriers to maintain the fighter and attack aircraft, their associated weapon systems, and assist in providing logistics support. The number of CETS personnel currently aboard and at sea with the four aircraft carriers operating with the Atlantic Fleet in the Indian Ocean--the JOHN F. KENNEDY, the AMERICA, the FORRESTAL and the INDEPENDENCE--total 131, at a cost of approximately $80,000 per man-year or $10.5 million annually.

The Commander of a Navy F-14 Fighter Wing advised the Investigative Staff that his unit would experience at least a 50 percent reduction in operational capability without the present level of CET support. By comparison, the representative of a tactical Air Force unit reported tactical capabilities could be maintained without CETS personnel. However, the Investigative Staff noted that the E-3A (AWACS) aircraft, including those in Saudi Arabia, could not function as a viable airborne warning system without the use of CETS support aboard the airplane to maintain and operate the essential radar function.

The loss of the experienced E-5 through E-9 career oriented maintenance personnel has caused the services to utilize "routine personnel to do specialized work." The inability of such untrained personnel to perform these tasks forced the Navy to turn to the use of "Technical Mercenaries" to maintain sophisticated and complex weapon systems. Additionally, the failure of contractors to provide the military with usable technical publications and related materials has significantly contributed to the problem and has dictated dependence on contractor support beyond initial contractual obligations for the new systems. The Navy's dependency has increased to such a degree that CETS personnel are employed as Logistic Support Representatives (LSR) to locate, and facilitate the delivery of spare parts within and through the Navy's own supply system.

The Investigative Staff recognizesd that there are no easy and near term solutions to this problem nor has its magnitude

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been completely defined in this preliminary inquiry. However, considering the sophistication and complexity of weapon systems current in the inventory as well as new high technology system which will be deployed in the near future, we believe this problem will only continue to escalate. The Investigative Staff recommends that DOD be required to examine and identify its requirements for highly skilled military technicians and the obvious misdirection of career paths which now lack appropriate regard for skills that are in high demand in civilian industries. In this respect, the Investigative Staff was told that the loss of dedicated and able sevicemen is attributable to the failure of the service to provide financial and personal growth opportunities commensurate with their recognized skills. The Navy, for example, demands arduous sea duty of its technicians and cites this as one casual effect of low retention rates. However, the Investigative Staff found that a large number of CETS personnel aboard deployed aircraft carriers are former Navy technicians who found that pay and career opportunities were greater in the private sector.

USE

The above information was provided to the Secretary of Defense at the time of his appearance before the Subcommittee to discuss the Defense Appropriation request. The Secretary's response for the record follows.

RESPONSE

The Defense Department is conducting a thorough examination of the use of contractors for CETS and similar maintenance programs. The Defense Audit Service (DAS) is conducting a department-wide audit of how many people are involved with CETS and how they are managed. The department directive dealing with CETS will be updated and reissued following receipt of the DAS report.

The demand for qualified technicians is very high today and is projected to become more intense. It is unlikely that the government will be able to compete effectively with industry for large numbers of these people. Thus the Department is seeking the optimum level of contractor services while preserving combat capability and improving readiness.

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SHIP CONSTRUCTION CLAIMS,
INSURANCE CLAUSE VARIANT

Investigative Staff inquiry indicates that Navy ship construction contractors have interpreted a recent civilian insurance settlement, so as to abrogate certain responsibilities for failure to comply with contract requirements, including defective workmanship. If taken further, interpretation would allow the shipbuilders to cover all risks, including any delay and disruption.

The Navy, in an attempt to offset actions brought on by this new interpretation incorporated language in Request for Proposals modifying the insurance clause to exclude shipbuilder coverage for defective workmanship, defective material, mismanagement, and delay and disruption. The Navy then proceeded to "foul their anchor" by acceding to shipbuilder's demands to purchase commercial insurance to cover the excluded areas. Furthermore, the Navy authorized the insurance costs to be included as allowable overhead charged to contracts.

The Navy's action allowing shipbuilders to purchase commercial insurance coverage previously excluded is inconsistent with the general and historical Government policy of having the Government serve as its own self-insurer. If these anomolies persist, the initial acquisition price of ships will rise dramatically and will establish procurement practices inimical to the best interests of DOD.

USE

The above information was provided to the Secretary of Defense for comment when he appeared before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following comments were provided for the record.

RESPONSE

Since 1942, insurance coverage in Navy shipbuilding contracts has been provided by a contract clause and by the separate insurance policy identified in the clause. The insurance policy is a slightly modified version of the 1042 edition of the commercial Builder's Risk Form. The contract clause stated that the shipbuilder should not incur the expense of insurance for loss of damage to the vessel and the materials used in its constructiion, and that the Navy will be a self-insurer under the identified insurance form. The contract clause also provided procedural guidance upon occurrence of a covered loss or damage. The American commercial shipbuilding insurance industry has always maintained

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that the Builder's Risk policy does not provide a guarantee of satisfactory performance by the shipbuilder, nor does it insure against consequential loss or damage (delay and disruption).

In 1979, Electric Boat identified problems it was experiencing under its Navy shipbuilding contracts involving correction of work performed improperly and replacement of materials which did not meet specification requirements. The contractor advised that it considered costs associated with resolution of these problems to be reimbursable under the insurance coverage provided by their shipbuilding contracts. The Navy promptly and firmly denied such liability.

In 1980, during negotiations for the fiscal year 1980/1981 TRIDENT shipbuilding contract, the subject of insurance coverage for faulty workmanship and defective, non-conforming materials and delay/disruption was raised. The Navy reiterated its longstanding position that these types of risk were not covered by its insurance policy or contract clause. In view of its recent experiences, Electric Boat was unwilling to assume those risks for the new TRIDENT contract. In order not to leave itself exposed, EB made inquiries on the amount of premium they would have to pay to obtain commercial coverage for those risks, and so advised the Navy. In order to avoid future controversy, the Navy modified its contract clause to state expressly that the Navy was not insuring the contractor against unsatisfactory performance or consequential loss or damage.

As the sole source supplier of TRIDENT submarines, Electric Boat's negotiating position was strong with respect to minimizing its risks. Had the Navy been adamant that the contractor absorb the commerical insurance premiums out of its profit, it is clear Electric Boat would have increased is profit position sufficiently to cover the premium cost. If the contractor had purchased insurance of this nature out of its profits and if the contractor then filed a claim against the insurance policy for costs also allowable under the government contract, the Navy believed that the contractor might seek payment from both the insurer and the government. By recognizing the premiums as an element of cost, the Navy was able to exercise some control over the insurance policy and the associated costs, and the Navy ensured that any insurance payments would be credited to the government.

These actions were consistent with the general and historical Navy policies with regard to self-insuring shipbuilding contracts. The Navy has consistently maintained that its Builder's Risk policy does not insure against defective materials and workmanship or against consequential loss or damage (delay and disruption). As a rule, the Department of Defense has never prohibited a contractor from acquiring insurance to cover risks for which the contractor is liable. Further, the applicable procurement regulations may permit the costs of such insurance to be charged to

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Navy contracts provided the types and extent of coverage are in accordance with sound business practice and provided the rates and premiums are reasonable under the circumstances. The agreement with Electric Boat was intended to avoid interpretive problems with the Navy's coverage as self-insurer and with existing regulations covering allowability of costs under Navy contracts.

The Navy is aware of the recent commercial insurance claim settlement noted by the Investigative Staff report. Some shipbuilders apparently have viewed this settlement as a new potential basis of claims. The settlement had little, if any, bearing on the Navy's position in dealing with the Electric Boat fiscal year 1980 contract provisions inasmuch as the Electric Boat problems surfaced and were addressed long before the commercial claim was settled.

Navy acceptance of additional Builder's Risk protection insurance costs for other shipbuilding contracts will be handled only on a case-by-case basis and then only after precontract award reviews are completed and necessary approvals obtained.

COMMENT

The DOD response is misleading. DOD implies that they allowed Electric Boat to purchase commercial insurance to cover defective workmanship, defective materials, and/or delay and disruption--and passed the cost on to the government--as if such a practice was "in accordance with sound business practice". The Investigative Staff believes--quite strongly--that such a position is erroneous. To allow such a policy is to enable a shipbuilder to avoid any risk whatsoever in accepting a ship construction contract. Obviously, this is not "in accordance with sound business practice". The costs of commercial insurance to cover defective workmanship, defective materials, and/or delay and disruption should not be paid by the Government.

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COST REIMBURSEMENT CONTRACTS

The cost reimbursement type contract is the most undesireable method of contracting since it provides little, if any, incentives for the shipbuilder to economize and provides no motivation to complete the ship on time.

It is the Navy's policy to negotiate cost-reimbursement type contracts initially for construction of early models of a new ship class where high technical and cost uncertainties exist. For follow-on ships, the Navy's policy is to use fixed price incentive type contracts as the technical difficulties and cost uncertainties can be reasonably identified. However, in 1979, the Navy awarded to a major shipbuilder, a cost reimbursement contract for construction of the DD 997 destroyer even though this was the 35th ship of DD 963 Spruance class to be built at this shipyard.

This situation occurred because the shipbuilder had lost $350 million on an earlier DD 963 proposal under a fixed price incentive contract with escalation clauses.

USE

The Secretary of Defense was provided the above information at the time of his appearance before the Subcommittee to discuss the Defense Appropriation request for FY 1982.

RESPONSE

The conclusion of the Investigative Staff is wrong. The contract for DD-997 Destroyer to Ingalls Shipbuilding clearly followed established Department of Defense regulations with regard to contract type.

When the uncertainties involved in contract performance are of such magnitude that cost of performance cannot be estimated with sufficient accuracy to permit use of a fixed price type contract, then use of a cost reimbursement contract is appropriate.

The Navy concluded that costs could not be estimated with sufficient accurancy because of the following major factors:

1. Cost Uncertainty.-- Ingalls was experiencing a substantial workforce reduction as a result of a decrease in its backlog. This was expected to have a major effect on overhead rates and retention of skilled personnel, but the magnitude of this effect could not be accurately predicted at that time. Although the future volume of Navy work could to some extent be assessed, future

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workloads were highly dependent on the success of Ingall's efforts to obtain Navy shipbuilding, conversions, and overhauls or other commercial work to use available shipyard capacity. Use of a fixed price type of contract would have resulted in substantial contingencies being included in the contract price. By using a cost type contract, the Navy was able to eliminate from estimated amounts the contingencies included as a result of cost uncertainties.

2. Technical Risks. -- The DD-997 Destroyer design is an update of the DD-963 Class Destroyer design. Many of the original components and equipments procured for the first DD-963 Destroyers in 1970 have undergone extensive and substantial technical improvements. Similarly, the DD-997 technical baseline reflects many modifications, improvements, and equipment updates which had not been accomplished by Ingalls at the time the DD-997 contract was negotiated. The uncertainties associated with these many changes would have required the inclusion of substantial price contingencies had a fixed price type contract been used.

Department of Defense regulations further provide that the nature of pricing arrangements for other work to be performed concurrently with a proposed acquisition be considered when determining contract type. During the construction of the DD-997, the other major new construction work at Ingalls is the Iranian Destroyer and the CG-47 class (CPAF). Use of a fixed price type contract for the DD-997 could have resulted in unbalanced emphases for the three major programs. For example, under a fixed price DD-997 contract Ingalls could have been encouraged to devote an inordinate proportion of their skilled resources to the detriment of other two programs.

COMMENT

The Investigative Staff is convinced that the Navy awarded a cost reimbursement contract to a major shipbuilder due to the contractor's refusal to take a "chance" on a Navy Fixed Priced Incentive (FPI) contract with escalation provisions. The Navy's comment deals with "cost uncertainties" and "technical risks" involved in DD 963/997 Destroyer design class of ship. Their arguments are weak and are completely refuted when one considers that the Trident is probably the most complex, technically difficult and cost uncertain program ever undertaken by DOD yet this program was solicited and contracted using the FPI type contract.

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CHANGE ORDERS

During the course of visiting shipbuilders, the Investigative Staff learned that in FY 1980, the Navy entered into a Cost Plus Incentive Fee contract for construction of the TARC-7, a prototype vessel. Within a month after signing the contract, the shipbuilder received a (Navy) Headquarters Modification Request (HMR) outlining numerous design changes. The Navy estimates that the changes will cost in excess of $1.5 million. The contractor has estimated a 9 month delay in construction of the ship citing numerous changes and incomplete design. Allegedly the finished ship is urgently needed for national defense.

USE

The Secretary of Defense was asked to comment on the above point during his initial appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following comments were provided for the record.

RESPONSE

NAVSEA agrees with findings of the report, but disagrees with the conclusion. HMR 1, issued on 21 August 1979, had been identified during January-June 1979 period, prior to ship contract award of 17 August 1979. Changes identified were held in abeyance to preclude perturbation of source selection process (January-July 1979) in recognition of importance of awarding contract in timely manner and prior end of fiscal year. HMR 1 was issued as soon as possible following contract award to assure essential corrections incorporated in design and to minimize impact on contractor's detail design effort.

While shipbuilder attributes 9 month delay to changes only, the U.S. Navy considers causes for delay include following additional factors:

Contractor slowdown related to litigation.
Contractor total yard workload (Navy and commercial).
Contractor engineering manpower shortage.

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CONTRACT OVERHEAD CLAUSES

Navy shipbuilding contracts are designed to provide escalation payments on those items of overhead which are affected by inflation. Past Navy contracts have provided for payment of escalation on 75, 90, and 100 percent of overhead costs. Under present Navy policy in a competitive solicitation, 95 percent of the overhead costs are subject to escalation provisions. This figure is not applicable across the board to the amount of overhead subject to escalation as incurred by individual shipyards, and in the opinion of the Investigative Staff should be ajusted consistent with actual experience. The Defense Contract Audit Agency has identified a number of major shipyards where overhead costs applicable to escalation are less than 95 percent. As a result, the Navy is overpaying escalation on overhead costs which are not subject to inflationary pressures.

USE

The above information was provided to the Secretary of Defense for comment when he first appeared before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply for the record.

RESPONSE

The general purpose of escalation provisions concerning the portion of overhead affected by inflation is to provide an equitable basis for final computation of profit under cost-plus-incentive-fee and also under fixed price-incentive contract types. It should be noted that the contractor will receive allowable costs pursuant to Section XV of the DAR. The aforementioned contract types are usually based on target costs which are expected to exclude amounts for projected inflation costs. The effect of escalation provisions is to provide a basis for computation of inflation costs and to exclude these costs from the total costs incurred in the computation of the final profit amount pursuant to the contract incentive formula. Since a shipbuilder's ability to affect the impact of inflation on his costs is not great, most of the risk is assumed by the Navy. To the extent possible, fixed costs included in overhead should be excluded from escalation coverage, as has been the case in most recent shipbuilding contracts.

For competitive solicitations, it is necessary to specify uniform escalation provisions so that all prospective offerors will compete on essentially an equal basis and, therefore, estimated escalation recovery is not needed as an evaluation factor. It is considered appropriate to limit escalation coverage for overhead costs to 95 percent for competitive solicitations. A tailored overhead coverage rate based on DCAA audit advice is appropriate for sole source solicitations.

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COMMENT

The Navy's comment regarding "Contract Overhead Clauses" misses the point. The Navy states that "a tailored overhead coverage rate based on DCAA audit advice is appropriate for sole source solicitations". Yet this same approach is presumably not appropriate for competitive solicitations. The very nature of the overhead application would appear to make this technique even more appropriate for competitive solicitations. GAO has demonstrated that there are many costs being included in overhead rates which are fixed and this should not be subject to escalation provisions e.g. depreciation on facilities and equipment. Some shipyards are fully owned while others are fully or partically leased (facilities and/or equipment). Including these costs in a competitive solicitation could give a decided advantage to the contractor with the fully owned facility and cost the Government millions of dollars in unearned escalation payments.

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NAVY AIRCRAFT ENGINE SPARES

The Investigative Staff, in association with data provided by GAO, developed information concerning requirements for spare aircraft engines in the Navy. The Investigative Staff found the Navy requirements for spare aircraft engines continue to be overstated. The overstatement can be illustrated by the Navy's insistence on having a 30-day supply of aircraft engines for the F-14 aircraft on 10 of its 12 aircraft carriers at all times, and requiring a 90 percent confidence level by having sufficient numbers of spare aircraft engines for replenishment to meet operational programs. Until July 1980, DOD had been unable to convince the Navy to change its position.

On July 31, 1980, the Secretary of Defense issued a Program Decision memorandum to the Secretary of the Navy to reduce the FY 1985-86 funds for aviation engine support for outfittings aboard carriers not scheduled to be committed in the first 30 days of conflict.

A reduction in the number of carriers authorized to carry a 30 day supply of spare aircraft engines for the F-14 alone could lead to a reduction of about 12 aircraft engines costing over $2 million each or a total of $24 million for carriers not included in the 30 day commitment.

A DOD triservice study group is working with computer model techniques to improve the method of calculating aircraft engine requirements. The new method should result in more efficient requirements determination for aircraft engines for peacetime and wartime needs.

The above is an example of formulas being used in computing requirements which have created a likely erroneous determination of requirements.

USE

This summary was included in Subcommittee Hearings on DOD Appropriation for 1982 and the Secretary of Defense was asked to comment on its content.

RESPONSE

The Secretary responded that an allowance of spare engines to support the deckload of aircraft assigned to each carrier is essential. On board spare engines are required to support sustained operations in remote areas, such as the Indian Ocean, where our logistic support lines routinely are exercised to their

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limits, and to ensure maximum flexibility in the utilization of carrier assets. Recent operational experience clearly confirms that 30 days is the minimum acceptable level for engines spares, and that the sharing of limited assets among several carriers (crossdecking assets) is not a viable alternative for effective logistic support. On board spares requirements for engines are not currently computed to support carriers that are undergoing comprehensive overhaul of service life extension program (SLEP). However, the flexibility for immediate deployment of any carrer on short notice must not be constrained by the lack of spare engine assets.

Spare engine outfittings are necessary to attain the flexibility and operational sustainability for response to emergent national requirements.

COMMENT

The DOD maintains that a 30-day allowance to support aircraft assigned to each carrier is essential and that "crossdecking" engines is not a viable alternative. Providing a 30-day allowance for carriers not scheduled to be committed in the first 30 days of conflict is an ultra conservative and wasteful practice that should be terminated.

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MANAGEMENT OF INVENTORY FOR SUPPLY SUPPORT OF SUBMARINES

In June 1977 GAO issued a report to the Congress concerning the Navy's management of inventory for supply support of submarines. This report showed that the Navy could reduce future inventory investments between $59 million and $73 million by changing the criterion for determining the items and quantities to be stocked and retained aboard submarines and submarine tenders.

Normally submarines and supporting tenders are authorized inventories for 90 days of operation. Additional quantities and items are stocked for continuous operations based on recurring demands for these items. Navy fleet-wide policy authorizes this additional stock when two recurring demands are received at any time within a 6 month period and the item warrants continued stocking as long as one recurring demand occurs within every subsequent 6 months. This is identified as the 2/6-1/6 frequency of demand criterion.

GAO found that the use of this criterion for adding items or quantities to the inventory caused frequent and large quantities of excess supplies aboard submarine tenders. For example, in each of 3 years the submarine tenders had off-loaded an average of $24 million in stocks as excess to their needs. In order to determine whether the use of a different demand criterion for stocking items would reduce this continuous development of unneeded excess inventories, GAO requested that the Navy conduct a study of 11 alternative stocking criteria using a Navy developed computerized simulation model. The Navy had conducted a similar study using the same model 2 years earlier. Both the Navy's and the GAO requested study showed similar results.

These studies indicated that a 2/6-2/12 months of demand criterion would achieve more favorable results in terms of tradeoff between inventory investment, reduction of stock excesses and requisition fill effectiveness. This criterion would authorize (1) stocking the item after recurring demands occurred in 2 separate months over a 6-month period and (2) retaining the item in inventory as long as recurring demands occurred in 2 separate months over a subsequent 12 month period. The results of the GAO study indicated that (1) future investments in inventory would be reduced by $59 million to $73 million, (2) excesses could be reduced by 66 percent, and (3) requisition fill effectiveness would decrease by only 1 to 3 percent. (Fill effectiveness is the measure of a supply source's ability to fill recurring demand requisitions received from supported units.)

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In the DOD comments to GAO on the final report, the principal Deputy Assistant Secretary of Defense (MRA&L) stated that DOD concurred with GAO and that the criterion for demand based stocking aboard CONUS-based tenders would be revised to two recurring demands in a 6 month period to establish and two recurring demands in separate months every 12 months to retain the item in stock. DOD also stated this would necessitate reprogramming of the system which would require approximately 6 months. In addition, DOD stated the Navy will evaluate the results of revising the stocking criterion with actual data aboard the CONUS submarine tenders prior to testing it aboard deployed tenders and submarines.

The Investigative Staff met with the Navy to ascertain the current status of the frequency of demand criterion for submarines and their tenders. The Navy informed the Investigative Staff that it was still using the 2/6-1/6 criterion which had been criticized by GAO and which DOD had informed GAO the Navy would revise and evaluate. The Navy stated that its position was based on attaining a better readiness posture and that the studies identified in the GAO report indicated a possible 3 to 4 percent decrease in off-the-shelf supply effectiveness under the revised criterion of 2/6-2/12 months of recurring demand.

A review of the GAO report shows that the Navy study conducted in 1974 stated that adoption of the 2/6-2/12 months of recurring demand criterion would reduce requisition fill effectivenes by only 2 percent. Furthermore, the later GAO requested Navy conducted study demonstrated that using the 2/6-2/12 criterion would decrease the requisition fill effectiveness for submarine tenders by 1 to 2 percent and for submarines by 1 to 3 percent. In addition, GAO showed there were a number of other factors in the studies that caused the decreases in requisition fill effectiveness rates to be overstated. For example, 10 to 20 percent of the requisitions were incorrectly coded as recurring which results in an understatement of requisition fill effectiveness. Also, the study assumed a zero balance for beginning inventories on board the selected submarines and tenders. However, in an actual situation more of the items in the study would have been provided in the initial inventory allowances and in sufficient quantities to sustain operations for at least 90 days; this, likewise, results in an understatement of requisition fill effectiveness.

The Investigative Staff requested the Navy to furnish evidence of its revision of criterion and evaluation of the 2/6-2/12 months of demand criterion for tenders and submarines in accordance with the DOD concurrence in its reply to the final GAO report. The Navy informed the Investigative Staff that it was not aware of the DOD concurrence and that it had not revised its criterion or conducted any actual usage of the 2/6-2/12 criterion either aboard submarines or submarine tenders.

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The above information was provided to the Secretry of Defense for comment at the time of his appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following reply was furnished for the record.

RESPONSE

The implementation of the GAO recommended criteria has been accomplished as follows:

a. Stocking criteria of 2 demands in 6 months to establish and 2 demands in 12 months to retain have been implemented in submarine tenders both CONUS and deployed. The policy has been promulgated via appropriate directives from LANTFLT and is in the process of being promulgated from PACFLT.

b. To further refine the criteria for demands to be recorded in separate months for both establishment and retention as recommended by GAO, requires a program change to the Shipboard Uniform Automated Data Processing Systems (SUADPS).

c. Establishment of the criteria to record demand in separate months to implement the proposed GAO recommendation would have required a change to the ADP system used on board submarine tenders. The program change was overlooked and consequently was not requested nor implemented.

The Navy goals for material availbility aboard submarine tenders are not being met at the present time. It was estimated in 1977 that to implement the revised stocking and retention criteria would reduce effectiveness by 2 percent on board submarine tenders. At this point it would appear that not implementing the required ADP change aboard submarine tenders was fortuitous from an effectiveness perspective but it also indicates that other changes may have occurred since the original GAO and Navy studies. In view of the current performance shorfall and the elapsed time since the previous studies, it is considered that the Navy should reexamine the issues of those studies and develop stockage criteria which will minimize the generation of excesses while meeting the requisite fill effectiveness goals.

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Report of March 17, 1981

MISMANAGEMENT OF SPARE PARTS IN SUPPLY SYSTEMS

In response to the Committee's interest in mismanagement of available spare parts held in military departments' supply system; the Investigative Staff has learned that during the past 3 years GAO has issued a number of reports related to these subjects. These reports have demonstrated that each of the military departments--Army, Navy, and Air Force--could improve its management control, and identification of supply system assets that could be used for organic maintenance or furnished to contractors for use in modifications or in production. GAO reports identified potential cost savings or reductions in excess of $62 million that could be realized through more effective use of assets that are available in the military department supply systems.

In its report, "The Army Should Use Available Serviceable Parts to Avoid Repairs" dated January 31, 1979, GAO pointed out that two Army maintenance facilities repaired 2,180 different items when there were over 1 million units of the same items in the supply system inventories. The GAO estimates that approximately 776,000 labor hours could be saved in future years by using parts available instead of repairing items already on hand in the supply systems inventories. The total cost of the labor hours that could be saved amount to approximately $18 million.

In another report, "Air Force Continues To Repair Parts When Serviceable Parts Are Available," GAO demonstrated that of 25,500 items scheduled for maintenance, the Air Force had 1.7 million units of the same items available in its supply system. Tests conducted at three Air Logistics Centers of 379 items, demonstrated that the repair of 199 items could have been avoided by using assets available in the supply system. This alone would have resulted in a savings of $761,000. These represent savings on less than 1 percent of the 25,000 items for which serviceable quantities of items were available in the supply system inventories at the same time period. GAO said it knew of no realistic method of placing a dollar value on the total potential savings that could be realized through the avoidance of repair costs by using available quantities of items that might be repaired during a future period of time. However, if one would reduce the savings shown by the GAO by 50 percent and using that data, extrapolate it to the 25,500 items scheduled for repair, the savings could exceed $38 million.

GAO conducted another review of the Air Force system for providing supply system assets to contractors performing modifications on equipments. The tentative results of this review

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indicate that approximately $30 million may be saved if available assets from the Air Force and Defense Logistics Agency supply systems inventories were furnished to a modification contractor instead of permitting them to buy the parts from commercial sources.

Additionally, GAO issued its report, "Increased Use of Available Assets in New Production Can Save Millions" dated March 5, 1979. This report identified a minimum of about $14 million of long leadtime aviation parts that could be furnished to contractors for FY 1980 production of aircraft airframes, engines, and aerial target drones. GAO also identified $1.2 million of long leadtime aviation parts that were available but not furnished for FY 1977-78 production of aircraft parts. This has been a continuing problem.

In February 1963 GAO pointed out the need for the Navy to identify and use its excess serviceable spare parts in the production of new aircraft. In a follow-up report issued in December 1969, GAO showed there was a continuing need for improvement in the Navy. GAO pointed out that existing procedures and practices did not provide for utilizing available long supply and excess aeronautical spare parts for use as Government Furnished Material (GFM) in the production of new aircraft. In response to GAO recommendations the Navy issued instructions in December 1970 and August 1974 which require screening and furnishing components and parts for use as GFM by contractors in producing airframes and engines.

In response to inquiries by the Investigative Staff, the Navy could not provide any evidence to indicate whether any of the $14 million of long supply aviation parts identified by the GAO reports were ever provided to contractors for use in production. However, the Navy did show that as of June 1979 the Navy Aviation Supply Office (ASO) had identified $8.1 million of long supply assets available for potential use on production contracts. Further inquiries indicate that ASO has been requested by the cognizant Navy contracting office to set aside approximately $1 million of the available $8.1 million of available long supply assets for use on production contracts.

Due to the lack of readily available data or nonavailability of data pertaining to actions that may have been taken by the military departments, the Investigative Staff was not able to ascertain whether any actions were taken or any improvements made as a result of GAO reporting on these matters to the DOD. (Directive points 14 and 21.)

USE

The above information was included in hearings held by the Subcommittee on the Defense Appropriation request for FY 1982. The Secretary of Defense was provided the information and his response for the record is shown below.

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RESPONSE

In a series of Reports, the GAO recommended that the Services utilize available long supply inventories in lieu of repairing unserviceable components. In each case GAO cites specific instances in which component repairs occurred even though stocks of the repaired items were available in the supply system. Further, GAO cites the need to maintain visibility of inventories at all echelons of supply. In response to each Report, GAO was advised that DOD policy requires use of available serviceable assets prior to use of repair or new procurement sources. All DOD materiel requirements computation systems assume full utilization of recorded unserviceable and repairable assets in the development of procurement and repair requirements. In specific cases where repair has occurred despite the availability of long supply serviceable assets and no special justification exists, corrective action has been or is being taken.

DOD concurs with GAO's statement that there is a need to give "priority attention and focusing of effort" on this matter. Specific actions have already been initiated by each Service to reduce total inventories and/or obtain better use of assets: For example, the Army has initiated changes to insure that information regarding the status of long supply items is transmitted directly to the Army Depot Maintenance process. The Navy has begun a review of shipyard inventory management procedures to require industrial activities to rely more heavily on the central supply system for materiel support and the Air Force has already modified several materiel management and maintenance regulations to minimize unnecessary repairs.

Improved retail visibility is being addressed both by independent Service Program--Army's SIMS-X, Navy's CLAMP-FIRM and Air Force AFRAMS and by OSD sponsored improvements. OSD programs include, for example, the Retail Inventory Management and Stockage Policy (RIM-STOP) effort. DOD issuances were published in 1979. RIMSTOP, which is scheduled for implementation by the end of calendar year 1981, will provide significant improvements as a result of less layering of inventories, improve asset visibility for selected items, improve supply performance, and will provide greater system uniformity throughout the Department of Defense.

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V. INDIVIDUAL ISSUES IN REPORT OF SEPTEMBER 23, 1981

On September 23, 1981, a second report on this directive was submitted to the Chairman. This report consisted of an Overview and Summary as well as four substantive volumes. The following section of this report contains a detailed presentation of each issue, its usage, the DOD response, and Staff comments and disposition, where appropriate.

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Report of September 23, 1981

ABRAMS M1 TANK

The Army has requested over $2.2 billion in FY 1982 to procure 720 ABRAMS M1 tanks for U.S. forces in Europe and the United States. The M1 tank still has design deficiencies and fails to meet several requirements pertinent to maintainability and supportability, and actual production continues to lag far behind previously planned and funded delivery schedules. The Army FY 1982 M1 program request can be reduced by approximately $400-450 million without adverse effect.

Summary

The Army's new main M1 battle tank program, which began in 1972, is considered to be the Army's top priority weapon program. The M1 is the Army's third attempt to design a new battle tank. The first two programs were considered unnecessarily sophisticated, excessively complex, and too expensive.

The Army Materiel Development and Readiness Command (DARCOM) has primary responsibility for the development and acquisition of the M1. The M1 Project Manager in Warren, Michigan, is the DARCOM manager of the program with responsibility for the development and initial acquisition of the M1. The M1 Program Manager is reportedly unique in Army program management because "he is the only program manager in the Army with independent contracting capability." The Army Training and Doctrine Command (TRADOC) M1 System Manager represents the interests of the tank "user" community. The M1 is currently being produced at the Army tank plant in Lima, Ohio, and future production capabilities are scheduled for the Army tank plant in Warren, Michigan.

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M1 engineering development was conducted from 1976 to 1979. Following extensive operational and developmental testing from March 1978 to September 1979, limited rate production was initiated. The first "production" vehicle was delivered in February 1980. A second phase of extensive operational and developmental testing was conducted to assess the readiness and suitability of the vehicles for full scale production and fielding. These tests were completed in May 1981.

As a result of a program review in February 1981 and subsequent to completion of the test referred to above, the Army type classified the M1 tank as standard, denoting acceptance of design and readiness for fielding, on the basis that:

-- The majority of M1 development was complete and planning is sufficiently mature to insure adequate support for an M1 fleet.

-- Maturation of the remaining items can be completed without undue risk to M1 readiness.

-- The M1 is supportable in the near term considering the relatively low production rate and the intensive management of logistics issues.

The Army contends that the M1 was initially fielded in January 1981 when a small number of tanks were issued for operational testing at Fort Hood, Texas. An initial complement of tanks has also been transported to Germany for the purpose of fielding an M1 battalion early in CY 1982.

Major Army and OSD program decisions for full scale production and European fielding are scheduled for August and September 1982.

The major findings developed from the review of the M1 program are as follows:

-- Hardware design deficiencies have been a continuous problem which have adversely impacted the normal maturation of the M1 tank. While the M1 is superior to existing tanks in survivability and mobility, unresolved design deficiencies seriously degrade the potential operational capability of the M1.

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-- Design problems with the 120 mm gun model of the M1 tank (M1E1) will probably result in a production delay from 1984 to 1986.

-- Although the Army claims that the M1 is the most tested Army weapon system, the M1 still does not meet all RAM-D operational and support requirements. Army procedures for "scoring" tests have resulted in an overstatement of the tank's potential performance in a true operational environment.

-- Production startup problems have been excessive and have caused continual slippages in M1 production. Only 480 of the 720 tanks to be procured with FY 1982 funds can be produced within the funded delivery period. Consequently, the M1 FY 1982 budget request can probably be reduced by approximately $400-450 million without adverse effect.

-- Failure to develop and acquire an adequate logistics support capability makes the highly complex M1 tank difficult to maintain and its sustained operational availability questionable. Contractors services will be required to support the M1 tanks in the United States and Europe.

-- The Army does not yet have a final approved fielding plan for the M1 tank. The latest revision of the fielding plan is unrealistic due to production delays and shortages of support and test equipment.

The Army's optimism has resulted in the establishment of overly optimistic production and fielding schedules which have caused program instability and chaos, to the extent that the M1 program is now overfunded and out of synchronization with the fiscal process. To help overcome these deficiencies, the Army needs to stabilize the program and develop realistic milestones.

M1 Design Still Changing

Although the Army has classified the M1 tank as standard and contends it is in production, a stable design has not been achieved.

Army officials in the program manager's office informed the Investigative Staff in May 1981 that no significant design changes were in progress. Reviews at Chrysler Defense, Incorporated, the prime contractor, a number of major subcontractors, and the Army testing agencies revealed a different story.

During the conduct of the most recent M1 developmental and operational tests (DT/OT-III), completed in May 1981, a number of failures occurred which indicate that design deficiencies continued

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to plague the M1 tank. These deficiencies could potentially impact the operational effectiveness of the tank. Some of the subsystems and components affected are:

-- turret stabilization system,
-- the power train (engine, transmission, and final drive),
-- commanders weapon station,
-- track and road wheels,
-- armor skirts, and
-- gun muzzle referencing system.

Two design changes being investigated for the turret stabilization system by the manufacturer, Cadillac Gage, have potential impact on firing accuracy. One of these involves a gun oscillation problem in cold weather temperatures beginning at 9 degrees Fahrenheit. Several options are reportedly available for correction. Some of these options involve the use of a much more flammable oil which could impact crew survivability. As of May 1981, Cadillac Gage officials stated that they did not have a solution for this problem. Because of abbreviated cold weather testing, the impact on gun firing accuracy could not be determined. The second problem in the stabilization system is an unstable damping of the gun under ambient temperatures. In late April 1981, Government inspectors at the Lima tank plant refused to accept two tanks because of this problem. The refusal was short-lived, however, because the program manager directed that the tanks be accepted with the deficiency noted. Cadillac Gage officials advised the Investigative Staff in May 1981, that they did not know the cause of this problem or its long term effect on gun firing accuracy. Tanks delivered through the month of July 1981 were still being accepted with this deficiency.

The transmission originally designed for a 56-ton vehicle is sensitive to the weight of the tank. It was upgraded to accommodate a 58-ton weight, and subsequently validated for a 60-ton vehicle. Officials of the manufacturer, Diesel Allison Corporation, report that they have been "designing as they produce." At the present time, design changes are in progress to correct a number of deficiencies found through testing. These involve the clutch arrangement, final drive, shifting mechanism, and correction of a critical heat condition in the oil cooling system. The manufacturer stated in May that current lab tests indicate that the design changes in progress should correct the deficiencies. Interestingly, the design change recommended to correct the critical heat condition was to operate an auxillary fan on a full-time basis. This consumes some additional power and fuel and eliminates a reserve cooling capacity.

The M1 component which has consistently been a primary cause for concern has been the AVCO manufactured gas turbine engine. In spite of the fact that approximately $39 million was spent for research and development (R&D) of this "evolutionary" engine in

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its early phase, and $91 million during the engineering development phase (total $130 million) the design is still not stable. Engine production was halted from December 1980 to February 1981 to investigate a bearing problem and institute a corrective redesign. As of May 1981, there were still a number of redesign efforts in progress and a number of product improvements recommended by the manufacturer to improve performance, maintainability and overall availability. Many of these product improvements indicate obvious design deficiencies. Some examples are:

-- power shaft modification,
-- improved turbine nozzle cooling,
-- stronger inlet guide vanes,
-- oil seal improvements,
-- bearing improvements, and
-- heavy wall recuperator housing.

The commanders weapons station has gone through a number of "user" redesign efforts so that in its present form it is poorly designed. Unusual dexterity is required to perform normal functions such as firing while tracking. Although not now presently programmed, a major redesign will probably be required in the future.

The production design of the armor skirts preclude their interchangeability. These skirts are an important vulnerability protection and are highly susceptible to damage during normal operation. At present, they can only be replaced by special order, grinding of replacements to size, or the time consuming method of readjusting and shifting all other skirts on the tank.

Army officials reported that several other design reviews were also in progress. One of these involves seeking a better solution for replacing a "thrown track" in the field. Another involves the excessive number of road wheel replacements. Both of these problems have resulted from a previous "design fix" to reduce the frequency of thrown tracks. The gun muzzle reference system is also being restudied. This system, important for fire control, has consistently displayed problems of mounting stability, alignment, and moisture.

Auxillary kits normally provided with a tank, such as winter operation, mine clearing, water fording, and bulldozing are not presently part of the current M1 design or in production.

In addition to basic tank design deficiencies, a large number of production design changes are still occurring at the Lima Army tank plant. The fifth version (mod F) of the M1 tank was scheduled to begin production in the August 1981 time frame.

Based upon current evidence, and in contradiction to Army contention, it appears that even though the M1 tank is in its second year of production, a significant number of design deficiencies still exist in the tank and its production process.

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U.S./Federal Republic of Germany (FRG)
Mutual Design Efforts Not Productive
(The 120 mm M1 Tank--The M1E1)

The Army plans to upgrade the M1 tank by replacing the 105 mm gun with a 120 mm gun to meet the projected improvements in Soviet tank armament. Current plans call for Chrysler to begin producing M1 tanks with 120 mm guns (M1E1 tanks) in 1984. The date will probably slip by 2 years because of problems in designing the gun and ammunition and reconfiguring the M1 tank to accept the 120 mm gun.

Delays by FRG Postpones Delivery
of M1E1 Tanks and 120 mm Ammunition

Apparently as a result of a "quid pro quo" agreement, the U.S. and German governments agreed to mutually design and use a number of common items on the M1 and Leopard tanks. These items included the 120 mm gun, turbine engine, track, sprocket, and fire control system. An Army official stated that the German government has apparently lost interest in adopting most of these items for its Leopard tank to the point where the program now only includes the 120 mm gun and ammunition and some metric tools and fasteners.

In 1978 the Army and the Department of Defense (DOD) decided that the M1 tank should be equipped with a 120 mm gun and production should begin in August 1984. Although an agreement was signed with the German government, it took 13 months for the German government to obtain licensing authority to permit U.S. production of the gun. Under the agreement, the United States and Germany also agreed to concurrently develop 120 mm ammunition. The Army has developed several versions of the 120 mm ammunition but are awaiting designs for the igniter cap from the Germans before they can be completed. These caps are produced by a German firm and the German government is encountering delays in getting the licenses for their design. An Army official stated that another igniter cap could be designed but it will also take time. Consequently, redesign of the M1 tank to accept the 120 mm gun has slipped. The Army's Program Manager for the 120 mm gun stated that the August 1984 production date is absolutely unachievable. He stated that 1985 is possible but difficult and that the spring or summer of 1986 is probably more realistic.

120 mm Gun Creates Design Changes for M1 Tank

Chrysler Defense Incorporated has been awarded a contract for $75.0 million to design the configuration changes in the M1 tank to accommodate the 120 mm gun. Chrysler officials advised in May 1981 that the total configuration requirements for the M1E1 were still unknown. Chrysler officials further stated that no major component redesigns were required. Chrysler's subcontractors and Army officials disagreed. Some of the more significant changes anticipated are:

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-- Design changes to the transmission are required because of the additional weight of the 120 mm gun configuration.

-- The stabilization system will have to be redesigned because of the weight increase.

-- The ammunition compartment will have to be redesigned because of the change in the number of rounds carried in the M1E1.

Conclusion

The FY 1982 budget contains $125 million based upon M1E1 production beginning in 1984. It appears that the M1E1 tank production will be delayed until 1986. The Army should reevaluate its M1E1 funding requirements based on likely production slippage.

M1 Fails to Meet Performance Requirements
Assessment of Test Results Questionable

Recent M1 testing has demonstrated that initial production vehicles are deficient in several performance areas. In the area of reliability, availability, maintainability, and durability (RAM-D), the requirements for power train, track, and road wheel durability and for maintainability were not met. Fuel consumption requirements also were not achieved.

The Army's methodology of scoring and assessing M1 test results and the results generated through this process are questionable and not realistically representative of M1 performance expectations in a typical operational environment.

RAM-D and Performance Deficiencies

The Army recently concluded another series of extensive developmental (DT) and operational (OT) testing at Aberdeen Proving Ground, Maryland, Fort Knox, Kentucky, and Fort Hood, Texas. Through a process of "scoring" and "assessment" conferences, the results from these tests were used to evaluate the performance of the M1 tank.

The following table indicates the Army's evaluation of M1 performance based upon the latest RAM-D "assessment conference."

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RAM-D ASSESSMENT:
M1 DT/OT III TEST RESULTS--AUGUST 1981

	Requirement	DT III	OT III	Combined
Mission Reliability (MMBF)	320	336	360	350
System Reliability (MMBF)	101	99.3	160.8	126
Maintenance Ratio	1.25	1.34	--[a]	1.34
Power Train Durability (Prob/4000 mi)	.5	.41	.35	.37
Track Durability	2,000	--	--	1,056
Road Wheel Durability	3,000 miles without 20% replacement	Unable to measure		
Fuel Operating Range at 25 mph	275	--	--	231

[a] Denotes no data provided.

Test results obtained by the Investigative Staff from Ft. Knox and the testing agencies prior to the recent Army scoring and assessment conferences indicate even lower results. For example, test officials at Ft. Knox reported:

-- A power train durability of .2 instead of .35.
-- A mission reliability of 277 instead of 360.
-- A track durability of approximately 1,000 instead of 1,056.
-- A maintenance ratio of 2.67 instead of 1.34.

Although test results must admittedly be evaluated and adjusted, the Investigative Staff noted that a number of failures were "dropped" during evaluation and believe that the scoring/assessment conferences may have purged the test results.

Power Train Durability

While the Army's latest assessment of power train durability is .37 against the requirement of .5, a [illegible] number of power train component failures were omitted. The following chart compares the number of power train component replacements at Ft. Knox, Ft. Hood, and the Aberdeen and Yuma Proving Grounds with the number of components scored as failures as of March 15, 1981.

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POWER TRAIN COMPONENT REPLACEMENTS
VS. SCORED FAILURES--MARCH 1981

Component	Number of Replacements	Number Scored As Failures
Engine	6	2
Transmission	15	4
Final Drive	11	0

Because of the high cost of the power train, (approximately $400,000 for an engine), failure to achieve a higher power train durability will result in increased operational costs.

Mission and System Reliability

The results of the Army's latest RAM "assessment conference" indicate that the M1 has met mission and system reliability requirements. The following table compares these results with previous "scoring conference" results from tests conducted at Ft. Knox, Ft. Hood, and the Aberdeen Proving Ground.

SCORING CONFERENCE ASSESSMENTS OF
RELIABILITY DURING DEVELOPMENT TESTING

	Goal	First	Second	Third	Fourth	Fifth	RAM Assessment Aug. 1981
Accumulated Mileage	—	3,275	4,588	5,977	8,917	10,984	10,984
System Reliability	101	93.6	81.9	76.6	76.0	75.0	99.3
Combat Mission Reliability	320	448	428	344	277	251	336

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SCORING CONFERENCE ASSESSMENTS OF
RELIABILITY DURING OPERATIONAL TESTING

	Goal	First	Second	Third	Fourth	Fifth	RAM Assessment Aug. 1981
Accumulated Mileage	—	1,622	4,244	6,131	9,386	14,026	14,026
System Reliability	101	81	125	109	107	130	160.8
Combat Mission Reliability	320	193	319	296	277	304	360

Track Durability

Track durability is also a significant item. The Army's test results indicate that the M1 track life is approximately 1,000 miles against a requirement of 2,000 miles. Since M1 track costs approximately $19,000 each, the operational cost of providing M1 track replacement will be significantly higher than that for existing M60 tanks which go at least twice as far at less cost. Although the Army claims that the M1 track is "state of the art," the research and development efforts for track has been minimal. Less than $1 million has been spent with a leading supplier of track on track research and development over the last 10 years, while over $100 million was spent in the same time period to develop the M1's turbine engine.

Road Wheel Durability

Road wheel durability is another significant operational requirement. Although a large number of road wheels were replaced during M1 testing, the Army contends that "Road wheel durability could not be determined during DT III due to a secondary failure (track misguide caused the track centerguides to gouge the rubber rim of the roadwheels). Once the track misguide problem is solved, the roadwheel durability requirement should be met." The Army is reportedly conducting a design review to attempt correction of the "track misguide problem." No matter what the cause, the frequent road wheel failures create a maintenance and logistics burden.

Fuel Range

The M1 also did not meet the fuel operating range requirement of 275 miles travelling at 25 miles per hour on level secondary roads. The M1's high rate of fuel consumption, 2.3 gallons per mile, under these conditions is considered a major deficiency. Of even greater concern is the high 4 gallons per mile rate of consumption

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under normal battlefield conditions. The M1's increased fuel consumption will drastically increase fuel and support costs for a fleet of M1 tanks. Although the Army contends fuel consumption is less and within the requirement at higher speeds, normal operating speeds must be kept in mind.

Maintenance

The Army tests also failed to demonstrate that the maintenance ratio requirement of 1.25 maintenance hours to 1 operating hour could be achieved. The failure is significant when it is considered that maintenance testing was conducted over an extended period of time with a special supply system and with what the Investigative Staff believes to be better than average soldiers.

For the entire test period, including the initial fielding of tanks at Ft. Hood, the M1 component and spare parts supply has been "specially handled." A special central parts management program was established by the Army and contractor representatives assigned at test locations to expedite parts resupply. If the part was not immediately available at the Army depot, contractor personnel made factory arrangements for expedited delivery. In light of the special arrangements established for the test period, the value of M1 performance data developed in which the availability of parts is a factor is questionable.

Summary

In 1979, the House Appropriations Committee expressed concern that the M1 had not yet demonstrated the required RAM-D capability during previous testing. The FY 1980 Defense Appropriations Act restricted the use of M1 program funds until the Secretary of Defense certified that the M1 RAM-D criteria had been met. In March 1980, the Deputy Secretary of Defense certified that RAM-D contractual requirements had been met and released the remaining M1 FY 1980 funds. Yet, as of June 1981, at least 4 of the 13 M1 RAM-D requirements have still not been met--power train durability, track durability, road wheel durability, and maintenance ratio.

Test Organization and
Scoring Process Questionable

Developmental testing is conducted to demonstrate that engineering design and development is complete and a new system will meet its specifications. Operational testing is conducted to estimate a new system's operational effectiveness and suitability.

The Army's organizational test structure and methods used to evaluate test results appear to inhibit the accomplishment of testing objectives.

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The Army consistently reports that "the M1 is the most tested combat vehicle in the Army's history." GAO reports have questioned the Army's M1 testing methodology and have expressed doubts that test results realistically demonstrate the operational performance which can be expected in a typical field environment. The M1 testing program has been affected by:

-- too early and concurrent testing and
-- the test organization and evaluation process.

In an attempt to speed up the M1 program, the Army frequently initiated testing prematurely. During these testing periods, the design of the tank was not stable and a large number of equipment problems occurred. On many occasions, design modifications were applied by contractors on the test vehicles during the test programs. Because of the design changes and the concurrency of developmental and operational testing, tests often had to be deferred or quickly redone. As a result, testers were often testing outdated or modified configurations. Test results were therefore frequently split between different configurations and represented abbreviated testing on an unstable design.

The Army Materiel Systems Analysis Agency (AMSAA)is responsible for the design of the M1 developmental test plan and the independent evaluation of test results. The developmental tests are performed by the Army Test and Evaluation Command (TECOM). The Operational Test and Evaluation Agency (OTEA) is responsible for design of the operational test plan and the independent evaluation of operational test results. OTEA is assisted by personnel from the Training and Doctrine Command, Combined Arms Test Activity (TCATA), the Armor Engineering Board, and troop units from various Army Forces Command (FORSCOM) activities. Representatives from various other TRADOC and Army Materiel Development and Readiness Command (DARCOM) activities also actively participated in the testing and evaluation process. M1 testing was therefore conducted in a "multiplayer" environment.

M1 test results were analyzed and scored through a committee process referred to as "scoring conferences." There were four voting members in these conferences. TRADOC represented the user community. The M1 project office represented the developing community. The Army Materiel Systems Analysis Activity and the Operational Test and Evaluation Agency represented the testing communities. Each representative had one vote, except for TRADOC which had two votes whenever ties occurred. Other attendees included contractor representatives from Chrysler, AVCO, Detroit Diesel Allison, and Hughes Aircraft and officials from other Army activities. According to a scoring conference participant, contractor representatives had endless arguments why various incidents were not caused by equipment failures or should be scored as a no test since they should not have happened. Additionally, M1 Program Office officials were quick to offer evidence that recent engineering design or production changes had nullified the impact of a failure.

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The Investigative Staff was told that AMSAA and OTEA frequently disagreed with TRADOC and the PM, but were out voted. In fact, the minutes of one scoring conference meeting states that, "* * * as always, the majority (3:2) was voting for no system failure." (TRADOC with two votes and the PM one.) It appears that pressure was exerted on the testing community to make the test results "look good."

The disconcerted Army testing organization and the processes used to evaluate test results may have resulted in minimizing or invalidating M1 performance deficiencies.

Poor Production Process Delays M1 Tanks

Although over $700 million has been obligated to refurbish facilities and purchase new tools and equipment to build the M1 tank and the tank has been in production for nearly 2 years, Chrysler and its subcontractors have not yet established a stable and efficient production process which can produce the number of tanks currently scheduled by the Army.

Facilitization

The Army's original estimate to facilitize the Army's tank plants at Lima, Ohio, and Warren, Michigan, and Chrysler's Scranton and Sterling plants as well as various subcontractor's facilities, totaled approximately $1 billion. Although this amount was subsequently reduced to $811 million, the FY 1981 Supplemental Appropriation included $105 million for facilitization and the FY 1982 budget submission includes another $41 million.

In May 1977, the Army entered a letter contract with Chrysler to identify the equipment requirements necessary to produce a maximum of 90 tanks per month. Three months later the contract was amended to reduce the facilitization to a production rate of 60 tanks per month on a one-shift basis with a surge capacity to 150 tanks per month on a multishift basis.

Based on this contract, Chrysler and its subcontractors prepared facilitization plans. Rather than providing facilitization funds on a time phased basis to coincide with the planned production schedule, the Army provided funds on a first-come first-served basis. As a result, some of the subcontractors who got their plans in early are overfacilitized for the requirements of the currently planned production schedule. Yet, because of inconsistencies in implementation, they are underfacilitized in a few specialized areas to meet even the most recently reduced production schedule.

Army officials admitted that Chrysler and its subcontractors have tended to overfacilitize. Also, neither the Army M1 program management officials nor Chrysler officials know how much facilitization has occurred. The Army has initiated a study to determine

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the current status of facilitization and the contractors actual production capacity. The study was reportedly completed in July but as of August 24, 1981, the Army has refused to make the results available to the Investigative Staff. It seems unreasonable that in the middle of the second year production the Army did not know the actual production capabilities of its prime and subcontractors.

Production Capability

The original plan for the M1 tank called for a series of 1-year procurements of tanks beginning in FY 1979 and continuing until the delivery of 7,058 in FY 1988. The following table shows the original and most recently revised plan for procuring the tanks:

FY	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Total
Original	110	352	569	720	802	1,080	1,080	1,080	1,080	185	7,058
Revised	90	309	569	720	802	1,080	1,080	1,080	1,080	248	7,058

The number of tanks to have been purchased in FY's 1979 and 1980 were reduced because the unit price of the tanks increased significantly after the appropriations had been received. The first 90 tanks which should have been delivered by January 1981 were not fully accepted until April 1981. According to the Army's current production schedule the FY 1980 buy of 309 tanks will not be delivered until March 1982.

Based on their performance to date, Chrysler and several of its major subcontractors have not yet developed a stable production base to meet even the revised production schedule. The following table compares the actual deliveries of tanks and major components under the original Chrysler contract and the Army's latest revised delivery schedule. The table shows that actual deliveries are well below the original funded estimates.

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M1 TANK AND COMPONENT PRODUCTION AND DELIVERY SCHEDULES AS OF JULY 31, 1981

Tank/ Component	Original Contract	Feb. 1981 Revision	Actual Deliveries	Shortfall Original Contract	Shortfall Feb. 1981 Revision
Tank	282	226*	135	(147)	(91)
Engine	432	211	209	(223)	(2)
Transmission	432	202	433	1	231
Final Drive (sets)	432	202	451	19	249
Laser Range Finder	432	250	296	(136)	46
Thermal Imaging System	432	244	233	(199)	(11)
Gunner's Sight	432	210	279	(153)	69

* Army plan assumes tanks will be stored awaiting engines.

Army officials stated that at least three other revisions to the original schedule have occurred prior to the February 1981 revision. They stated that delivery schedules are very flexible and are revised periodically to reflect the contractors actual delivery experience and projections of what the Army and the contractors believe can be delivered in the future. Because of the continuous downward revision of the production/delivery schedules, many component manufacturers are beginning to "catch up." The following production/delivery chart illustrates that the number of tanks and engines are still behind even the latest reduced schedule.

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REDUCED FEBRUARY PRODUCTION SCHEDULE
VS. ACTUAL DELIVERIES OF TANKS AND ENGINES
DURING THE PERIOD FEBRUARY THRU JULY 1981

Contractor	Tank/Component		Feb.	Mar.	Apr.	May	June	July
		P	16	19	22	25	28	30
Chrsyler	Tank	A	5	7	14	17	18	10
	Shortfall ---------		(11)	(12)	(8)	(8)	(10)	(20)
		P	20	18	18	20	30	25
AVCO	Engine	A	20	20	14	17	29	29
	Shortfall ---------		-	2	(4)	(3)	(1)	4

P = revised plan, February 1981.
A = actual.

The Investigative Staff observed that the production problems at both the Lima Army Tank Plant and AVCO-Lycoming, the engine manufacturer, are the result of an immature production process. Production capacities are inhibited by equipment which cannot meet refuted design potential and a large amount of rework is required. Army officials reported to the Investigative Staff in May that it took approximately 36 days to cycle a new tank through acceptance tests and correct the average of 140-150 identified defects. Although Chrysler has had teams of production engineers working at AVCO on two separate occasions and the plant facilitization was reported to be 80 percent operational, AVCO officials acknowledged in May 1981, that the production rate was only approximately 45 percent of capacity. Because of this, efforts are underway by Chrysler and the Army to "off-load" some production requirements to other outside manufacturers. By reason of observed conditions such as these, the Investigative Staff does not believe that a stable, sustainable production base has been achieved.

During investigation of the M1 production program, nowhere did the Investigative Staff receive positive comment concerning Chrysler's program management. Quite to the contrary, many Army officials, including the program manager, and a number of subcontractors expressed concern about Chrysler's overall poor management. It appears that Chrysler officials comfortably believe they have a 20-year program. Because much of the M1 production facilities are in Government-owned plants; the work force consists largely of union labor; and the Army is planning to contract directly with many component manufacturers in FY 1982; the potential exists to effectively compete the overall program management in FY 1983.

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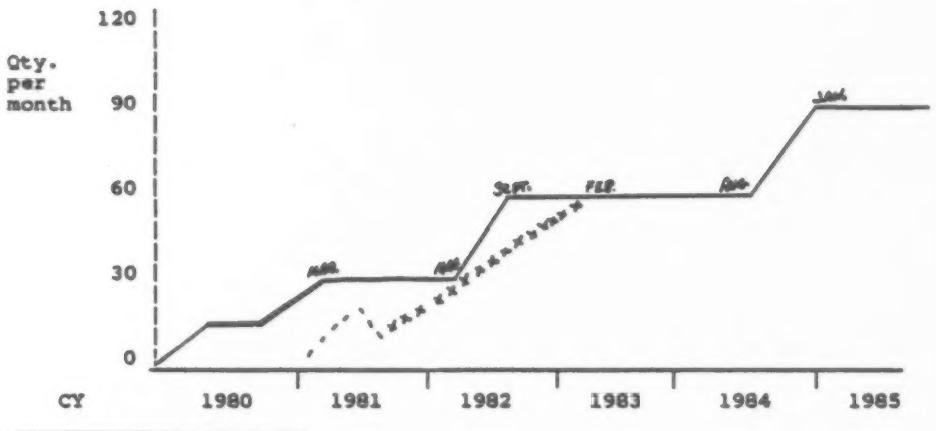
The impact of these production delays on the FY 1982 and preceeding fiscal year budgets is substantial. The following chart shows the Army's planned monthly production schedule, actual deliveries to date and the Investigative Staff's estimate of future production if improvements develop as the Army optimistically contends.

ARMY PLANNED M1 PRODUCTION SCHEDULE AND ACTUAL DELIVERIES THRU JULY 1981 VS. INVESTIGATIVE STAFF PRODUCTION PROJECTIONS



Legend:

_____ Army Plans

----- Actual

xxxxx Investigative Staff Estimate

This chart shows that the Army estimated that Chrysler would be producing 30 tanks per month at the Lima plant beginning March 1981. This rate would continue for 1 year until the Detriot tank plant could begin producing tanks. Both Lima and Detriot are scheduled to produce 30 tanks per month each, or a total of 60 per month

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beginning in September 1982 and continue until August 1984 when production would begin to increase to 90 tanks per month. As previously shown, Chrysler's actual production has consistently been far below the Army's expectations. The Army and Chrysler are exceedingly over-optomistic regarding Chrysler's production capability. Chrysler may attain a stable 30 tanks per month production rate about March 1982 and will then gradually increase to the 60 tanks per month rate by February 1983.

The immediate impact of the delay in meeting the planned production schedule is that the procurement program is out of synchronization with the budget process and is overfunded for FY 1979, 1980, and 1981. As shown in the following table, Chrysler is behind in its deliveries of the first 2 years tanks even though quantities were reduced. It appears that Chrysler will be at least 4 months late in delivering the third and fourth year procured tanks as well.

M1 FUNDED DELIVERY PERIODS
VS.
ESTIMATED AND ACTUAL FINAL DELIVERY DATES

FY	No. of Tanks	Funded Delivery Period	Final Delivery Date		
			Army Est.	Investigative Staff Est.	Actual
1979	110 (90)*	2/80-1/81	1/81	—	4/81
1980	352 (309)*	2/81-1/82	3/82	5/82	
1981	569	2/82-1/83	1/83	5/83	
1982	720	2/83-1/84	1/84**	5/84	

* Original number of tanks revised downward.
** Assumes only 480 tanks can be delivered within the funded delivery period.

The Investigative Staff believes the FY 1982 budget for the M1 program should be amended to provide funds for only the 480 tanks which can realistically be delivered by January 1984, the end of the FY 1982 funding period, rather than the 720 tanks requested.

Logistics Supportability Problems

There are significant deficiencies in the Army's logistics support capability for the M1 program. Because of the potentially adverse impact of these deficiencies on the maintainability and supportability of the M1, the Investigative Staff believes that there is a high degree of risk inherent in the Army's proceeding with M1 fielding as currently scheduled.

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The table below demonstrates the difficulty experienced by select Army mechanics and contractor personnel at Ft. Knox, Kentucky, in keeping M1 tanks operational. The table indicates the extended nonavailability of the test tanks during the 8-month test period which ended in May 1981.

Vehicle Number	Number of days non-operational for 24 hours or more	Percent of total test days tank nonoperational for a 24-hour period
6	104	44%
10	92	39%
11	68	29%
12	64	27%

The causes for this poor performance were the lack of effective test equipment, maintenance procedures, and spare parts. These and other conditions still exist.

Inadequacy of M1 Test Equipment

Because of the increased complexity and sophistication of the M1 tank, properly functioning test sets with associated accurate and complete technical manuals are vital to keeping the M1 in an operationally ready status. The M1 test equipment is not sufficiently adequate because of basic design flaws and insufficient quantities.

There were three test sets initially considered essential to maintain the M1 tank and a fourth special test device has recently been added. These are:

-- The Simplified Test Equipment (STE-M1) designed to permit a soldier in the field to diagnose problems in a number of M1 subsystems and identify faulty components.

-- The Direct Support Electrical Test Set (DSETS) designed to diagnose and repair M1 electronic systems.

-- The Thermal System Test Set (TSTS) designed to diagnose and repair the complex thermal imaging system.

-- A special test device called a "break out box" is being designed to work in conjunction with or in lieu of the STE-M1.

Design Flaws in the STE-M1

The STE-M1 is the most important test set because of its intended use by soldiers at the lowest organizational level to keep M1 tanks operational. It consists of 214 components in 7 boxes.

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occupying 20 cubic feet and weighing in excess of 390 pounds. The current cost of this equipment is about $158,000 per set. Before the STE-M1 can be used it must be transported to the tank in the field and hooked up. Set up time for the test set varies, depending on the test, but averages 45 minutes.

Although there has been a major improvement in the performance of the STE-M1 test set in the past several months, it can only be used approximately 75 percent of the time to diagnose tank faults and only correctly identifies the proper faulty component approximately 50 percent of the time.

Several design errors still exist in the STE-M1 test set. One of these involves the testing procedure. The tests must be carefully sequenced because any error along the way obliterates the test and necessitates a complete restart. Another design limitation of the STE-M1 is that it will always find a fault. That is, when sequenced through the steps for a particular subsystem, it always indicates a fault at the end of the sequence, even if none was previously found. This fault must be repaired or replaced before the soldier can determine if the tank is fixed. If there are multiple faults, the test set will "stop" on the first fault found. No provision exists to continue testing for other faults. Each fault must therefore be fixed in sequence of detection and a complete retest initiated whenever multiple faults exist. The Investigative Staff discussed these design faults with the manufacturer, RCA Corporation, and were advised that the design was inhibited by the limit of software memory allocated by Chrysler. Proposals have been submitted to Chrysler Corporation for future corrections.

According to Army test reports, other STE-M1 test set problems arise from test set bulkiness, excessive setup time, software deficiencies, manual changes and inaccuracies, and the soldiers general inability to associate a tank fault with the symptom in the manual. Additionally, the connectors are easily broken and the sets are generally not considered sufficiently durable to withstand a typical field environment.

The ability of the typical Army soldier in a battlefield environment to successfully attach the STE-M1, proceed through the intensive procedures, identify the proper faulty component, and accomplish repair in order to get the tank operational again in a reasonable period of time is questionable.

Quantities of Test Sets Limited

There is an insufficient quantity of STE-M1 test sets to support the current Army fielding plan. A controversy continues within the Army concerning the number of these test sets which will be required to support fielded units of M1 tanks. The program manager's plans indicate that a quantity of six sets per M1 tank

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battalion are required. European Army personnel slated to receive the new M1 tanks in CY 1982, have requested 10 to 12 STE-M1 tests sets to support each M1 battalion. Other Army officials believe eight per battalion is sufficient. Current contract deliveries do not appear to support fielding even at six per battalion. It is significant, however, that as of August 12, 1981, the Army does not know the actual number required and does not have a "Basis of Issue Plan" yet for this test set.

The requirement for the "break out box" test device was only recently established due to original problems with test sets and maintenance procedures. As a result, none were available during testing and the Army has only recently initiated contract actions with Chrysler for their procurement. It is, therefore, doubtful whether they will be available with their instruction manuals in time and in sufficient quantities to support the current fielding plans.

Production of the Thermal System Test Set, which is expected to cost approximately $400,000 per unit, is far behind schedule. Army officials optimistically stated that initial production test sets should be available sometime late in 1982; however, they will not be available in time to support initial Army fielding. Until these sets are available, five existing "hot mock up" versions will be used.

Although the quantity of the Direct Support Electrical Test Set appears adequate, it still requires an external regulated power supply which will have to be procured separately. Additionally, maintenance personnel have identified a need for a van to transport and effectively use both the DSETS and TSTS in a forward support area. None are currently authorized.

Manpower and Personnel Deficiencies

Analysis of M1 test results indicates that manpower requirements for M1 battalions will be greater than for existing tanks battalions. Current M1 personnel requirements do not reflect this increase. Furthermore, a recent decision by the Army Chief of Staff to field the M1 using a new operational concept known as Division 86, will result in still further additional personnel requirements.

Army regulations require that actual field experience obtained from new system tests be used to determine and adjust personnel requirements. Because of the magnitude of problems encountered during M1 testing (i.e., test equipment inadequacies, spare parts shortage, excessive hardware failures, etc.), there is insufficient actual data available to effectively assess M1 personnel requirements. Nevertheless, the Investigative Staff noted several manpower and personnel deficiencies as follows:

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(a) There is a critical shortage of trained personnel in several highly skilled areas such as mechanics and electronic technicians. This problem will be compounded when the M1 is fielded with its complex and sophisticated fire control system.

(b) The M1's 1500 horsepower gas turbine engine will require the development of new skills for automotive mechanics.

(c) The necessity for sophisticated support and test equipment dictates the training of test set repairmen and calibration experts.

(d) The M1's increased fuel requirement and decreased ammunition carrying capacity will necessitate additional truck drivers and supply technicians.

Effective implementation of the Army's "Total Force" concept is dependent on the active and reserve components working together to form a single Army, each highly dependent on the other. In the area of maintenance, the Reserve components provide a substantial amount of the Army's direct and general support maintenance capability. However, the Army currently has not identified reserve units to support M1 European units or even developed plans for reserve training programs for the M1.

M1 Maintenance Capability

M1 testing has demonstrated that Army troops have been unable to adequately perform required maintenance activities and to successfully keep M1 tank test vehicles in an operationally ready status. Although the Army contends that Army maintenance personnel have successfully maintained the M1 tank, the Investigative Staff learned that contractor personnel were assigned at all test sites. Though reportedly monitored, the fact remains that contractor personnel were called upon to assist in the maintenance of the tanks at both Ft. Hood and Ft. Knox when Army personnel were unable to diagnose problems or repair tanks. In addition, the Army has been unable to achieve an organic, depot capability by April 1981 as originally planned. Most depot support is being provided by contractors. It is obvious from the above conditions that the Army will continue to need contractor personnel for maintenance and support in the United States and Europe.

New and Additional Support Vehicles Will Be Required to Support the M1

To support the M1 in the field, a variety of additional support vehicles will ultimately be required. These are:

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-- Trucks to haul fuel and ammo, test sets, spare and repair parts, etc.

-- Recovery vehicles to retrieve nonoperational tanks from the battle front.

-- Heavy equipment transports to haul tanks.

In addition, other new or improved wheeled vehicles will be needed. For example, the M88 recovery vehicle lacks the power to pull the 60-63 ton weight of the M1 under the varying field conditions found on the battlefield. Army officials stated that a modification is needed to increase the power of the current M88's. Because of the M1's added weight, a new class of heavy equipment transport is currently being considered by the Army. During recent testing at Ft. Hood, Texas, there were 8 incidents of damage to either the tractor or the trailer during 33 attempted heavy equipment transport movements.

Conclusion

The Investigative Staff believes that insufficient effort and funding have been applied toward acquiring overall M1 logistics support resources. Consequently, the development of the M1 support capability critically lags behind tank development and production. For these reasons, the Army's ability to sustain support for the M1 in a realistic operational environment at acceptable levels of operational readiness is questionable.

Fielding Plans Constantly Changing

The Investigative Staff learned that as late as August 15, 1981, the Army does not have a final approved fielding plan for the M1 tank.

A number of fielding plans have been proposed and staffed through Army elements, but because of production delays and inadequacies in support and test equipment these plans have been continually revised in an attempt to match quantities of tanks with personnel, supplies, and support equipment. The confusion regarding fielding was recently compounded by an Army Chief of Staff decision to field the M1 tanks in a new combat organization called "Division 86." At the present time, the Army plans to field M1 divisions in FY 1982 as follows:

-- divisions to active units in Europe.
-- divisions assigned to POMCUS storage in Europe.
-- divisions to acting units in the CONUS.

Additionally, M1 tanks will be distributed to Army training elements.

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The current fielding plan upon which FY 1982 budget actions are based is not realistic for the following pertinent reasons:

-- It is highly doubtful that there will be a sufficient quantity of tanks produced in the required time frame. Present indications are that only approximately 500 of the 616 tanks required will be produced in time for FY 1982 distribution to all sources as planned.

--

-- There is doubt both by Army staff and European commanders that sufficient quantities of support test equipment will be available.

-- The availability of spare parts is also questionable. Army officials have admitted that this is a critical factor but believe that the problem can be controlled by "intensive management." It is the program manager's stated intention to resupply parts from the production line if necessary.

-- The present difficulties in maintenance and the failure of the Army to achieve depot maintenance capability as scheduled will require costly contractor personnel on site in Europe.

-- It appears wasteful to put new tanks in storage in Europe at this early stage when the need is so great in active units.

The Investigative Staff does not believe that the Army is ready to fully field the M1 tanks in Europe. Although it may be possible for the Army to initially field M1 tanks by "intensive management control," the Investigative Staff does not believe that the Army can realistically sustain a fielded force of M1's in Europe as planned. Because of the logistic problems with the M1 tank, the potential exists for another tank fiasco such as the M60A2. The M60A2 was fielded without adequate logistics support and because it could not be maintained it acquired notoriety as a poor tank. Since one of the most obvious advantages of fielding a new weapon with superior capabilities such as the M1 tank is psychological, the Investigative Staff believes it would be prudent and in the best national interest to assure its success.

Since the M1 fielding and distribution plans affect many aspects of the FY 1982 M1 budget, the fielding issue should be resolved and the budget amended based upon realistic requirements.

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Investigative Staff Analysis of
the M1 FY 1982 Budget Request

Based upon an analysis of the Army's FY 1982 budget request for the M1 program, it appears that:

-- Some FY 1982 cost projections and funding methods are questionable.

-- There are indications of substantial cost increases.

-- The FY 1982 budget is out of synchronization with need and can be reduced $400-450 million without adverse program impact.

The Army has requested the following funding for the M1 program in the amended FY 1982 budget request.

ARMY'S AMENDED FY 1982 M1 PROGRAM BUDGET REQUEST

Budget Account	Funding Requested (In Thousands)	
Research, Development, Test and Evaluation (RDT&E)		$ 136,600
Procurement Vehicle Costs	$1,624,000	
Advance Procurement	212,100	
Training Devices	50,600	
Spares	87,900	
Production Base Support	41,300	
		2,015,900
Operation and Maintenance		81,300
Military Personnel		9,600
Military Construction		15,500
TOTAL		$2,258,900

Approximately 80 percent of the $2.3 billion requested in FY 1982 are costs associated with tank production.

With adjustments for prior year advanced funding, the following table illustrates the Army's estimated unit and total cost to produce the 720 tanks requested with FY 1982 funds:

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PRODUCTION COST ESTIMATE FOR
FY 1982 FUNDED M1 TANK PROCUREMENT

Cost Category	Unit Cost	Total Cost for 720 Tanks
	(In Millions)	
Basic Tank and Major Subsystems--	$1.7	$1,224.0
Related Support----------	.6	432.0
Advanced Procurement----------	.2	144.0
	$2.5	$1,800.0

Questionable Cost Projections

The Investigative Staff's analysis of the Army's FY 1982 budget submission raised concerns regarding cost projections in several areas, such as engineering change orders and contractor services.

Engineering Change Orders

Although the M1 has been type classified as standard by the Army (a designation which asserts that the M1 design is acceptable for full production), $90,035 per vehicle is requested in FY 1982 for various engineering change orders. Thus, 4 years into production, $64,825,000--or 4 percent of total vehicle production costs--are requested for engineering change orders. Army officials stated that they could not identify the specific changes for which funding is requested and that this projection represents a best guess. The need for almost $65 million in change orders in 1 year is questionable. This figure seems particularly excessive considering the existence of other M1 cost elements which contain sizable funding for design changes.

Contractor Services

Significant changes were noted in the FY 1982 budget request over prior years for various Chrysler services, such as contractor engineering, quality assurance, and auxiliary services. The following chart illustrates these changes.

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INCREASED COSTS FOR CONTRACTOR SERVICES

Cost Element	FY 1980 Unit Cost	FY 1980 Total Cost	FY 1981 Unit Cost	FY 1981 Total Cost	FY 1982 Unit Cost	FY 1982 Total Cost
Contractor Engineering	$51,800	$16.0M	$45,200	$25.7M	$188,700	$135.9M
Contractor Quality Assurance	17,100	5.3M	21,700	12.3M	12,600	9.1M
Contractor Auxiliary Services	36,500	11.3M	29,000	16.5M	46,800	33.7M
TOTAL	$105,400	$32.6M	$95,900	$54.5M	$248,100	$178.7M

M = Millions

Army officials advised that the large increase in FY 1982 costs was because these costs were not fully funded in 1981. That is, rather than funding anticipated costs for the entire FY 1982 production period of 28 months (16-month production leadtime and 12-month production period), some contractor costs were funded for only 12 months. The amount of these costs and the wisdom of this "partial funding" technique is questionable. It raises doubts as to the validity of Army estimates for average program costs and does not identify for the Congress the most realistic projection of total program costs required to produce tanks in a funded year.

M1 Costs May Substantially Increase

The Army has in the past grossly underestimated M1 production costs. The Army requested funding to procure 110 tanks in FY 1979 and 352 tanks in FY 1980. During testimony before the House Appropriations Committee in April 1981, the Army acknowledged that in November 1980 they discovered that they were $33 million short to pay for the 110 tanks authorized in 1979. Therefore, it was necessary to reopen contract negotiations with Chrysler. The end result was that the Army could only procure 90 tanks--an 18 percent reduction of the FY 1979 authorization. It was also necessary to reduce the FY 1980 352 tank procurement by 12 percent to 309 vehicles.

Only 55 of the 309 tanks authorized in FY 1980 were delivered as of July 31, 1981, even though these deliveries cover half of the FY 1980 funded delivery period. Because of the extensive use of work arounds, offloading, special shifts, overtime, and other costly programs which have been initiated in an attempt to improve the M1

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production rate, the projected unit cost of $1.7 million in FY 1982 dollars per tank may significantly increase.

Advance Procurement Items

The large increases in the unit cost of long-lead funding items for the fire control system, engine, and gun/breech indicate future substantial increases in tank costs. Long-lead funding included in the FY 1982 budget request is provided to initiate preproduction activities in FY 1982 for systems and components to be used on FY 1983 funded tanks. The following table indicates some of these large increases:

ADVANCED PROCUREMENT COST INCREASES
IN COMPONENT LONG-LEAD FUNDING

Long-Lead Items For	Unit Costs FY 1980	Unit Costs FY 1982	Percent Increase
Fire Control System----	12,760	76,500	500
Engine----------	33,859	68,703	103
Gun and Breech---------	18,910	28,554	51

Special Tools and Test Sets

Analysis of the funding requirements for M1 special tools and test sets indicates that this area of the M1 program is underfunded. The Army test set program is still substantially behind tank development, and the quantity of special tools and test sets already purchased is insufficient to support the first 3 years of tank production and fielding. Because the Army has not yet identified the fielding requirements for this equipment, the appropriate quantity and associated funding required is still uncertain. The Investigative Staff believes that the $31 million requested in the FY 1982 budget is insufficient to correct the shortfall and support the FY 1982 procurement.

Prepositioned Tanks

The requirements for equipment to be included in Prepositioned Material Configured in Unit Sets (POMCUS) have reportedly not been considered, even though fielding plans include placing tanks in POMCUS in FY 1982. While one may question the concept of storing new, highly sophisticated and expensive tanks when they could more effectively be used by operational units, prepositioning tanks without funding for a complete "unit set" with spares, special tools, and test sets seems even more questionable.

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Stock Fund Items

During FY 1979, 1980, and 1981 the Army identified requirements valued at $246.7 million for M1 repair parts to be procured as stock fund items. An additional requirement for $148 million was identified in support of the Army's FY 1982 tank buy.

Analysis of the Army's requirements for stock fund items indicates that the additional requirements of over $148 million generated to support the M1 FY 1982 production are questionable. Many items ranging in value from $1,000 to $103,000 are being procured as stock fund items or expendables. Stock fund items are generally low value, nonreparable items consumed in use. Investment items are major end items or reparable assemblies.

A review of the stock fund items procured by the Army Tank Automotive Command (TACOM) revealed many items being purchased in this manner are properly investment items and should be funded with procurement dollars. A TACOM official stated that because there were insufficient procurement funds to purchase needed reparable spares, it was necessary to obtain them through the stock fund.

By funding these and other "high value" items through the stock fund as consumables, total M1 program costs are understated. A few examples of these items are as follows:

Nomenclature	Unit Cost
Gearbox	$ 34,553
Compressor rotor assembly	25,995
Air turbine diffuser	20,294
Forward housing pad	42,304
Compressor rotor	23,176
Air diffuser turbine	20,357
Pump and motor hydraulic	51,089
Turbine Assembly	103,181

The FY 1982 M1 Budget Can Be Reduced

There are opportunities to reduce the Army's FY 1982 M1 budget request of over $2.2 billion. Projected outlays may not be prudent based on the Army's failure to demonstrate that:

-- The M1 design has reached sufficient maturity to warrant increased production.

-- The production capability is sufficiently mature to produce quality tanks in the number requested for the FY 1982 funded delivery period.

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-- The M1 can sustain acceptable levels of operational readiness in a realistic operational environment.

Tank Vehicle Procurement

Based upon the current state of production, the Investigative Staff believes that the quantity of tanks to be funded in FY 1982 should be reduced by 240 tanks (over 33 percent) from 720 to 480. The eternal Army optimism that has characterized the M1 program management for the past 19 months with regards to M1 production capability has failed to materialize.

M1 production capability continues to be insufficient to meet previously authorized funded delivery periods. By failing to adjust its annual appropriation request to agree with achievable levels of production, the Army is asking Congress for FY 1982 funds to procure M1 tanks which it is not capable of producing during the established 28-month production and delivery period from October 1981 to January 1984. The M1 program should be redirected in order to properly align program requirements and allow time for the production levels to "catch up" to the proper funded delivery period. A 240 tank reduction in the FY 1982 appropriation would not slow the program down as the Army would have the Congress believe, but would provide the realistic time needed for program realignment.

Because some program costs cannot be proportionately decreased, the specific amount of vehicle costs which could be reduced by lowering the FY 1982 production by 240 tanks is not precisely definable. As a minimum, with some allowance for cost growth, the Army's FY 1982 M1 appropriation could be reduced by a tank unit cost of $1.250 million for 240 units for an overall reduction of $300 million without adversely impacting the M1 program.

Advanced Procurement Funding

The inability to produce at the scheduled rate of production results in the premature expenditure of advanced procurement dollars for long-lead items.

The FY 1982 M1 program request contains advanced procurement funds for the 802 tanks currently being planned for FY 1983 procurement at a cost of $264,464 per vehicle for a total of $212.1 million. The advanced procurement request could be reduced by $63.5 million to offset the long-lead items which would not be needed if the FY 1982 tank procurement was reduced by 240.

Procurement of Spares

M1 spares requirements for FY 1979, 1980, and 1981 were approximately $150 million. Another $87.9 million is requested for FY 1982.

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In a recent report, GAO concluded that M1 spares requirements in support of the first 3 years of production appeared excessive because of questionable methodology for computing spares requirements, and the 14 percent reduction in tanks procured with FY 1979 and 1980 appropriations.

Because of current production slippages, the procurement of additional spares without a complete reevaluation of requirements appears to be wasteful and inappropriate. The Army should reevaluate the requirement for spares based on a realistic assessment of achievable M1 production and fielding projections.

Production Base Support

The Army has requested production base support funding of over $41 million in FY 1982. The FY 1981 budget/supplemental included over $100 million for production equipment. Because of the current production disarray, a realistic assessment of the current achievable production capability should be completed prior to additional funding for production equipment.

120 MM Gun Program

Although the Army is now informally estimating that production of the M1E1 tank will begin possibly in 1985, the FY 1982 budget still contains funds for an M1E1 tank estimated to begin production in 1984. Some of the requirements on which the following FY 1982 M1E1 budget request was based are no longer valid based on the slippage in this program.

Currently the funds included in the FY 1982 budget for the M1E1 program are as follows:

	(millions)
RDTE	
Gun/Ammo	$ 22.1
Integration	62.0
Production Base Support	11.0
License Fee	15.0
Integrated Logistic Support	.2
	$110.3
Procurement	15.0
TOTAL	$125.3

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The Army should reevaluate the FY 1982 funding requirements for the M1E1 program and make reductions as appropriate to reflect the M1E1 production slippage.

Operation and Maintenance (O&M)

For FY 1982 the Army has requested O&M funding of $81.3 million in support of the M1 program. Analysis of this request indicates that it is based on current fielding plans for 616 tanks. The major M1 operating and support costs are those requested for:

	(millions)
Repair parts and fuel for using troop units-----	$26.9
Transportation costs for tank-----------	15.2
Depot maintenance-----------	14.8
	$56.9

Because of past and current production delays, these costs are apparently excessive to program needs. Army officials stated that based on reductions in the M1 production schedule and the March 1981 revisions to the M1 distribution plan M1 O&M funding could be reduced by approximately $10 million. As a result of program slippages to date, an overall reduction of $15-20 million is possible.

Conclusion

The Investigative Staff believes that as a result of production and program delays, the FY 1982 M1 program is currently overfunded and can probably be reduced by approximately $400-450 million without adverse effect to the program. The Army should reconstruct its FY 1982 M1 budget request based upon a realistic assessment of the current program status and actual FY 1982 funding requirements.

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USE

A summary of the above information was included in hearings before the Defense Subcommittee on the FY 1982 Defense appropriation request. The Secretary of Defense was asked to provide a reply for the record.

RESPONSE

The Army's current M1 FY 1982 funding requirement is $1,558 million ($1345.9 million for current year vehicles and $212.1 million for current year advance procurement).

The Army conducted extensive testing of its developmental equipment to identify deficiencies so they may be corrected before they delay fielding the system. The very extensive M1 testing has led to correcting those deficiencies.

Some problems found during testing impacted on maintainability and supportability. Many of these problems are being corrected by improving quality control and making some minor design changes to components of the tank. For example, the power-train durability requirement of the M1 was not achieved during the latest tests. Design corrections were proposed and subjected to a review by a Blue Ribbon Panel of experts who projected in August 1981 that tanks produced with the proposed fixes will exceed the Army durability requirement. Track life has been cited as a problem also. We may be asking more than the state-of-the-art can give us with this requirement; however, we have not given up. We have initiated programs to increase the life and are evaluating ways to reduce the peacetime cost impact. The current assessed maintenance ratio is not meeting the requirement (1.34 maintenance hours for each operating hour versus 1.25 required). We are attacking this problem on many levels, i.e., test sets, maintenance manuals, and personnel training. Solutions are being implemented in each of these areas. Perhaps more importantly, we are learning that as our soldiers become more familiar with the M1, fault isolation becomes more routine and the maintenance ratio should improve.

Production of M1's does lag behind our original contract schedule; however, this lag is primarily attributable to problems experienced when opening a new production line. We have seen progress during the last 6 months. At present, we believe our most significant problem is with the prime contractor in the areas of work flow management, work around procedures, quality control, and size of labor force.

COMMENT

As recently as March 1982, serious problems were still being experienced with the production of engines, tank hulls and turrets, and with quality control during the production process.

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It is extremely doubtful that a tank production rate of 60 a month can be sustained and, even more doubtful, that without significant improvements, a rate of 90 a month can be achieved even on a multishift basis.

The Army acknowledged some deficiences in the M1 tank but stated that, "The very extensive M1 testing has led to correcting those deficiencies." Specific examples cited by the Army included:

-- Many of the maintainability and supportability problems ** * * being corrected by improving quality control and making minor design changes to components of the tank."

As of February 23, 1982, there was a backlog of 150 Class I (major, cost to Government) and 260 Class II (minor, usually no cost to Government) Engineering Change Proposals waiting to be processed.

Quality control problems have persisted. As recently as April 1982, the Inspect and Repair station at the end of the assembly line is operating on an overtime basis three shifts, 6 days a week, to correct the deficiencies from inadequate quality control on the assembly line.

-- Although the power train failed to meet the durability requirement, a review of the proposed design changes by a Blue Ribbon Panel projected that it would eventually exceed the requirements.

The Blue Ribbon Panel, although implying that some design changes may eventually improve the performance of the power train, noted a number of significant power train problems and strongly disagreed with the Army's test assessment concluding that, ** * * none of the failures should be purged from the DT/OT III chargeable failures." On this basis, the power train durability is significantly lower (.27 percent probability of going 4,000 miles without failure instead of .34) against a requirement of .5 than that reported by the Army.

-- The assessment ratio is not meeting requirements (1.34 maintenance hours required for each operating hour versus 1.25 required), but we are attacking this problem on many levels.

The Blue Ribbon Panel disagreed with this evaluation because of "purged" test data, concluding that the maintenance ratio was even worse. Final RAM-D test data in February 1982 (unassessed by the Army) indicates a maintenance ratio of 1.51 versus 1.25.

-- Production of M1 does lag behind original contract schedule due to problems in opening a new production line. "We have seen progress during the last 6 months."

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As late as March 1982, serious problems were being experienced with the production of engines, tank hulls and turrets, and with quality control during the production process. After about 2 1/2 years of operation, the hull/turret fabrication process at the LIMA Army Tank Plant (Ohio), designed to produce 60 hulls/turrets a month on a one-shift, 5-day basis, was admittedly operating at only 33 percent efficiency and must be operated on a multiple shift, 6-day a week overtime basis just to sustain the current rate of production.

Engine production by AVCO Corporation continues to be a problem. As late as February 1982, there were insufficient operable engines on hand to meet assembly line requirements. As of March 9, 1982, engine delivery was behind schedule by 41, and by March 9th, only one of the 55 engines due in March had even reached the final production test phase.

It appears dubious that a tank production rate of 60 a month can be sustained and highly doubtful that a rate of 90 a month can be achieved even on a multishift basis without significant improvements.

Report of April 13, 1982

The September 1981 report noted a number of problems with the program and predicted that the planned production schedule could not be met. Since that time, the Army has modified the schedule but it still remains more optimistic than the Investigative Staff estimate cited in the 1981 report. An overview of some of the problem areas discussed in the earlier report was undertaken, and it was learned that a number of the problems still persist. The current problems can be classed as either production or RAM-D (Reliability, Availability, Maintainability-Durability) related. Problems associated with the fabrication of hulls and turrets at the Lima Army Tank Plant (LATP) and deliveries of several critical components have been creating difficulties for the assembly lines and threatens to slow production throughout 1982. In addition to Army acknowledgement that the tank does not meet durability requirements, it is doubtful that the tank has met the reliability requirements. For example, some of the more significant shortfalls of this nature developed during testing in February 1982 are:

-- The M1 System Reliabiity stood at only 82 Mean Miles Between Failure (MMBF) against a requirement of 101 MMBF.

-- The M1 Combat Mission Reliability was 256 MMBF against a requirement of 320 MMBF.

-- The M1 Power Train has a .27 probability of going 4,000 miles without experiencing a durability failure against a durability requirement of .50.

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-- The Maintenance Ratio was 1'51" (man-hours of maintenance to an hour of operation) against a requirement of 1'25".

-- Eleven engines have "drowned" (ceased operating) during the water fording tests (part of the contractor break-in and test procedure) at Lima in recent weeks. The cause(s) of this problem have not yet been determined.

-- An "overfuel problem" which can occur if power is lost while the engine is being started has not yet been eliminated. This can result in an engine fire, making the tank inoperable and necessitating extensive repairs.

-- The "fix" to reduce track misguides and track throws was to increase track tension. This apparently increased road wheel life, however, it also increased fuel consumption by 10 percent (during operational testing which approximates battle conditions, consumption rates of approximately 3 gallons per mile were experienced). It may also subsequently create other durability problems.

-- The main gun stabilization problems in cold weather situations have not been eliminated. Other stabilization problems previously cited were reported to have been resolved.

-- No deep water fording tests were conducted during DT III as the deep water fording kit would not fit and had to be returned to Chrysler. Therefore, the tank has not met this requirement.

The information set forth in the attached investigative summary updates some of the more significant problems previously cited in the M1 Program report. It is not a detailed analysis of these problems but provides current information for an ongoing assessment of the more pertinent issues.

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M-1 PROGRAM STATUS UPDATE

Production

The AVCO--Lycoming gasoline turbine engine has been a consistent source of problems. Officials in the M1 Program Manager's (PM) office have advised that this engine remains one of the most critical problems and is one of the "pacers" of the production line. Production planning requires a 35-day supply of engines to be on hand at all times. At the time of the Investigative Staff visit to the Lima Army Tank Plan (LATP) on February 25, 1982, there were insufficient operable engines on hand to enable the installation of the engines on the assembly line. As a result, engine installation was being accomplished after the tanks came off of the assembly line. Numerous engines were observed in a repair area awaiting efforts to repair them. Army officials at Lima advised that approximately one-third of the engines received from AVCO require some type of repair work before they can pass inspection and that there are always 5 to 10 engines "in the hospital." The number of engines which cannot be repaired and must be returned to AVCO at Stanford, Connecticut, is reportedly "down" to 10-12 percent from previously higher levels. Discussions with PM office representatives and AVCO officials indicate that after 2 1/2 years there are still significant production problems with the engine. As of March 9, 1982, AVCO was 41 engines behind on deliveries. This is reportedly due to problems in receiving parts being manufactured by vendors as well as those being made by AVCO itself. AVCO officials acknowledge continued "flow problems" with the engine assembly and delivery process. In order to produce engines consistent with the needs of the tank assembly lines, engine assembly and delivery should proceed smoothly and uniformly throughout each month. In recent months more than 50 percent of the engines have been delivered to Chrysler at the AVCO plant in Connecticut during the last week of the month. Engine deliveries to the Lima tank plant have therefore been inconsistent with production needs. During a visit to the AVCO plant on March 9, 1982, it was noted that only one of the 55 engines due in March had reached the initial test stage. Although many of the other 54 were in the assembly process, they were all awaiting the arrival of one or more parts. By March 19th, only 10 engines had completed this test phase and only 5 delivered to Chrysler.

The M1 Program Manager's Office analysis of AVCO's production schedule for the remainder of 1982 indicates that operating on the minimum 45-day leadtime required to consistently produce and deliver tanks there will be a shortage of 13 engines in December which will impact tank deliveries early next year. Even a small slippage in this tight engine delivery schedule could accelerate further, by several months, the continued failure to deliver tanks on time. As a further complication, the Army has agreed to provide engines (as Government Furnished Equipment) to Chrysler on a 75-day leadtime basis for the third year buy beginning in

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March 1982. Because of engine production problems the Army projects a liability to Chrysler of $370,000 for late delivery of 74 engines during the third year buy (calendar year 1982). This shortfall will begin in April 1982.

AVCO officials also discussed the possibility of a strike in May however, they discounted the idea that engine deliveries would be significantly affected. Reportedly, a 2-week vacation shutdown is planned for this summer and it would be canceled in the event of a strike. Although it is possible that a strike of no more than 2 weeks duration could be absorbed without seriously affecting total engine deliveries it could be expected to compound the flow problems already being experienced. A longer strike obviously would impact seriously on tank production. The PM's office has informed AVCO that their production schedule is unacceptable. The Army believes that AVCO can do significantly better. Based on AVCO's past performance, conversations with AVCO officials, and continued engineering design problems, the current AVCO schedule is probably more realistic than the Army's and may once again be optimistic rather than pessimistic as the Army claims.

Because of the many difficulties experienced with the turbine engine, the Army was directed by the Congress to test and evaluate a diesel engine alternative for the M1 tank. Although this evaluation is being accomplished, it is proceeding rather slowly and there is an apparent lack of enthusiasm for it. In view of the potential cost saving ($120,000 versus $360,000 for the turbine) and the turbine's engine's continuing technical and durability problems, this lack of enthusiam within the Army is perplexing and appears very short sighted.

At the present time, Thermal Receiving Units, a crucial high technology component of the Gunner's Primary Sight (GPS) are in short supply. These units are produced in a laboratory process. Hughes Aircraft, the subcontractor for GPS has advised that the problems are due to lower than expected yields (unacceptable quality) of crystal components. Deliveries have been behind schedule for the past 2 months and will probably remain behind for several more months. Although Hughes officials expressed confidence that the problem will soon be resolved, past experience and history indicates that this may not be the case. A further slippage could impact tank deliveries and once again cause partially completed tanks to be parked at the Lima plant.

Although the M1 tank is now being produced at two separate plants, the Lima Army Tank Plant at Lima, Ohio, and the Detroit Army Tank Plant (DATP) in Warren, Michigan, they are not independent plants. The fabrication, machining, and welding of all the M1 hulls and turrets is accomplished at Lima. The hulls and turrets needed at the Detroit plant are then shipped there. Thus any production problems in this area affect both assembly lines. Officials at Lima and in the PM's office acknowledge problems in this area.

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The Fabrication and Machining area at LATP was designed to produce 60 hulls and turrets per month (30 for LATP, 30 for DATP) on a one 8 hour shift per day, 5 days per week basis (1-8-5). After about 2 1/2 years of operation, Army officials acknowlege that the hull fabrication area is operating at only 33 percent efficiency and must be operated on somewhat more than a 2-8-6 (two 8 hour shifts, 6 days per week) basis. Further improvements will be necessary just to achieve and sustain the predicted 60 per month rate on this extended 2-8-6 basis. This low efficiency level raises the cost of the tank due to increased labor costs. Without significantly improving efficiency, it will be impossible to increase to 90 per month, even on a 3-8-7 basis.

The number of engineering changes and tank modifications continues to be both a source and indication of continued problems. As of February 23, 1982, there was a backlog of 150 Class I (major, cost to Government) and 260 Class II (minor, usually no cost to Government) Engineering Change Proposals (ECP's) waiting to be processed. These changes (Class I) may require retrofitting of tanks and cause further cost increases. The PM's office advised that the number of ECP's is of concern to them and they have instructed Chrysler to reduce the number of ECP's generated. Specifically, Chrysler was told to reduce the "nice to have" ECP's and concentrate on those that are considered to be necessities. Thus far 70-80 modifications have been proposed. Most have been adopted in groups and several are pending or are being applied. At the time of the previous Investigative Staff report, the tank was at Mod F, it is now at Mod H. The high number of engineering changes and tank modifications is a further example of the continuing instability of the program.

The Program Manager stated that quality control is the major problem facing the M1 Program. A recurring theme during discussions was that quality cannot be inspected into a product, it must be built in. The officials interviewed, uniformly were of the opinion that Chrysler management, although sometimes giving lip service to the quality control philosophy, does not really believe in it. Evidence of Chrysler's failure to follow this philosophy can be found at the end of the Lima assembly line where the Inspect and Repair Station is operating on a 3 shift, 6-day a week, (3-8-6) basis to correct the deficiencies resulting from inadequate quality control on the assembly line.

RAM-D

Throughout its history the M1 has been plagued by reliability, availability, maintainability and durability (RAM-D) problems. Problems in these areas continue to be major concerns. The Defense Systems Acquisition Review Council (DSARC) III decision to go ahead with full scale production, made in September 1981, was based on an Army RAM-D Assessment of Developmental/Operational Test (DT/OT) III results available at that time. This RAM-D assessment was the culmination of a number of prior test scoring and assessment conferences which "purged" the M1 test data to

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eliminate such things as operator error and failures supposedly corrected by "fixes." This scoring and assessment procedure has created doubt as to the objectivity of the RAM-D results.

The DT/OT III results provided to the DSARC III indicate that the tank's RAM-D figures were at or approaching the required levels. An independent assessment of the M1 Power Train conducted by a Blue Ribbon Panel of experts contemporaneous to the Army's RAM-D assessment disagreed with the Army's assessment and concluded that "...none of the failures should be purged from the DT/OT III chargeable failures." The actual RAM-D performance of the M1 tank was therefore less than that cited by the Army. Since that time, considerable additional developmental testing has occurred and the "scored" results at the conclusion of DT III have not shown the improvement the Army expected. The following chart indicates the cumulative results from several scoring conferences, the RAM-D assessment used at DSARC III and final DT scored results. An Army Assessment of the final DT data is planned for the near future.

RESULTS OF M1 DEVELOPMENTAL TESTING III

	DT Rqmt.	1st Score	3rd Score	4th Score Jun 81[4]	RAM-D Assessment Aug 81	Final (8th) Score Feb 82
Accumulated Mileage	--	3,275	5,977	10,984	10,984	18,094
System Reliability[1]	101	93.6	76.6	75.0	99.3	82
Combat Mission Reliability[1]	320	448	344	251	336	256
Maintenance Ratio[2]	1.25	1.21	1.58	1.71	1.34	1.51
Power Train Durability[3]	.50	*	.51	.34	.41	.27

[1] Reliability expressed as Mean Miles Between Failure.
[2] Maintenance Ratio is Man Hours of Maintenance to Hours of Operation.
[3] Durability expressed as probability of going 4,000 miles without a durability failure.
[4] Scoring Conference results used by the July-August 1981 Blue Ribbon Panel and also used for the August 1981 Army assessment.

* No Chargeable Failures.

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Report of September 23, 1981

INFANTRY/CAVALRY FIGHTING VEHICLES (IFV/CFV)

The Army has requested $869 million in FY 1982 to procure 600 Infantry/Cavalry Fighting Vehicles (IFV/CFV). A premature decision to type-classify and produce these expensive multipurpose vehicles has resulted in a concern that the vehicles to be produced may not effectively meet requirements. Production problems and changes in tests required to assess doctrine, tactics, vulnerability, and supportability have delayed planned achievement of an initial operating capability by more than 1 year and will probably result in costly design changes and additional program delays. Revised Army production and delivery schedules indicate that the FY 1982 IFV/CFV program request can probably be reduced by approximately $400 million without adverse affect.

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Summary

The Fighting Vehicle Systems (FVS) program for the development of an Infantry Fighting Vehicle (IFV) and Cavalry Fighting Vehicle (CFV) was authorized in 1976 as a reconfiguration of the developmental Mechanized Infantry Combat Vehicle (MICV). New Army requirements added a missile antiarmor capability to the reconfiguration. IFV/CFV development occurred from November 1976 to November 1980. Government tests to determine readiness for production took place from June 1979 to June 1980. The IFV/CFV was type classified as standard Army equipment in December 1979 and full-scale production was authorized in February 1980.

FMC Corporation in San Jose, California, is the prime contractor for production of the IFV/CFV. Major component contractors are the Hughes Aircraft Company, Hughes Helicopter Incorporated, and the General Electric Corporation. FY 1980 funding was provided for the production of 100 vehicles and the first one was delivered in May 1981. FY 1981 funds were provided for the production of 400 vehicles and FY 1982 funds are requested for the production of 600 vehicles.

The Investigative Staff review of the IFV/CFV program resulted in the following observations:

-- The need for the IFV/CFV is questionable.

-- The decision to proceed with full-scale production was premature.

-- Extensive tests are planned to determine if vehicles being produced will meet design and supportability requirements.

-- Achievement of an Initial Operating Capability has been delayed more than 1 year and could be delayed even further.

-- The current production schedule exceeds contractors production capacities.

-- Efforts to obtain a second source producer may not result in significant cost reductions.

-- The Army's IFV/CFV FY 1982 program request may be overstated by approximately $400 million.

The Investigative Staff believes that the Army should reevaluate the IFV/CFV program in terms of current combat needs

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and requirements and reestablish the program and associated funding requirements based on realistically achievable objectives.

The Need for IFV/CFV Is Questionable

The IFV/CFV essentially evolved from a number of old requirements which the Army had previously considered plus a few new requirements which appear to have been combined to justify the need for a new infantry/cavalry vehicle. The Investigative Staff questions the capability of the new IFV/CFV to effectively meet multiple mission roles and believe other vehicles and alternatives may exist.

Development History

The development history of the IFV/CFV vehicle has been a long one, dating back to the early 1960's. In 1972, the Army finally decided to build an infantry fighting vehicle with a one-man (gunner) turret, a 20mm cannon, and transport capability for an 11-man squad. The Mechanized Infantry Combat Vehicle (MICV) was ultimately developed to serve this purpose. It was a lightly armored, tracked vehicle with a one-man turret, a 20mm gun and carried an 11-man squad. Subsequently, the Army decided that they wanted the vehicle commander to be in the turret to see the battlefield, command the vehicle, and help the gunner with his complex job. This created the need for a two-man turret. At approximately the same time the Army was developing a vehicle called the Armored Reconnaissance Scout Vehicle (ARSV) to provide the cavalry with increased mobility and firepower. Prototype vehicles were built with a two-man turret and a 20mm automatic cannon. Both of these programs were ultimately terminated and the requirements combined with the Army's need for a faster armored personnel carrier to move infantry to the battlefield with the new M1 tanks. An antitank missile capability was also added. As a result, the Fighting Vehicle System (FVS) program evolved and these multiple requirements were incorporated into the design of the infantry and cavalry fighting vehicles, IFV/CFV. The IFV/CFV therefore is now intended to survive on the battlefield and:

-- Transport infantry to the field.	
-- Be an infantry fighting vehicle companion to the M1 tank.	. Suppress infantry . Destroy tanks with missiles
-- Be a cavalry fighting vehicle and perform scouting missions.	. Shoot at aircraft . Destroy light armored vehicles
-- Be an antiarmor weapon.	

Because of its multiple design requirements, the Investigative Staff and a number of Army officials question whether the IFV/CFV can effectively meet its combat requirements.

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Troop Carring Role

As an infantry transport vehicle, the IFV is designed to carry a 9-man infantry squad into battle. For over 21 years, the Army's normal infantry squad has consisted of 11 men and the current M113 armored personnel carrier transports them to the edge of battlefield. Moreover, the troop carrying capacity of the Army's new BLACKHAWK helicopter was specifically sized to accommodate the 11-man squad. The smaller IFV squad, brought about by the lack of the vehicles troop carrying capacity which is directly related to its "all things to all people" mission role, will require an elemental change in infantry organization and tactics. A 1980 Army operational evaluation report criticized the reduction of the infantry squad size to accommodate the design of the IFV. While the Investigative Staff has previously noted instances of specifications or requirements being ignored or altered when favored weapons systems failed to achieve them, this is the first time to the Investigative Staff's knowledge that a military service has actually changed its basic organization and "How to Fight" doctrine simply to accommodate a piece of equipment. The Investigative Staff stands in awe of the inertia in the DOD weapons procurement process which is demonstrated by such a change.

Fighting Vehicle Role

As an infantry and cavalry fighting vehicle, the IFV/CFV appears to be inadequately designed to survive on the modern battle field. Although crew survivability was of prime importance in the M1 tank and it was designed accordingly, crew survivability was not a similar priority in the IFV, as it is lightly armored with no special crew protection. The IFV/CFV with its antitank missile weaponry and forward location on the battlefield, will undoubtedly be a prime target for destruction by opposing forces. Considering the proliferation of man portable missiles and other light antiarmor weapons on today's battlefields, the IFV/CFV can potentially be destroyed by a wide variety of weapons with resultant high casualties.

What is Really Needed--Do Other Viable Alternatives Exist?

Due to the Army's constantly changing requirements for fighting vehicle systems, and the questionable capabilities of the IFV/CFV to effectively meet multiple requirements, the Investigative Staff questions what is really needed and if other viable alternatives exist to meet essential requirements.

If a faster armored personnel carrier is required, the Army currently has successfully completed a product improvement program which improved the power train and suspension of the existing M113 armored personnel carrier and substantially increase its speed. Although an August 1979 Army test report stated that the product improved M113A1E1 can attain speeds close to that of the M1 tank and this improvement was recommended by DARCOM, the Army has taken no further action in this respect.

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If more antitank missiles are needed on the battlefield, the Army has an Improved TOW Vehicle (ITV) program and vehicles are currently being produced and fielded. It is a modified M113 with a TOW missile launcher.

If a light tank is needed in a Combined Arms Team, the Army has several programs in progress to address this requirement. Two are the High Survivability Technology Vehicle-Lightweight (HSTVL) and the High Mobility/Agility (HMAG) programs. Both programs are examining various lightweight tank configurations. A light tank is also reportedly required for the Marines and the Rapid Deployment Joint Task Force.

Conclusion

The Investigative Staff believes that the IFV/CFV are very expensive vehicles which were designed to meet multiple requirements. Consequently, they may not be capable of doing any of them adequately. Since there appears to be some less expensive alternative to fulfilling the stated requirements for these vehicles, the Army should reevaluate this program and its overall armor and infantry program in terms of current combat needs and requirements.

Decision to Classify and Produce IFV/CFV Premature Due to Limited Testing

In an attempt to recover lost ground after termination of the Mechanized Infantry Combat Vehicle program and in response to time commitments made to the Congress, the Army instituted a number of concurrent actions to speed up the acquisition of the new Fighting Vehicle Systems. After only limited testing the IFV/CFV was type classified as standard Army equipment and full-scale production was initiated. Because of the limited testing the Army has scheduled a series of tests to determine if production vehicles will meet requirements. These tests will delay achieving an initial operating capability as originally planned and will probably reveal deficiencies which will increase program costs.

Decisions Based on Limited Test Data

Operational testing of a developmental IFV was conducted for only 6 weeks from October 15 to November 26, 1979. Concurrent development testing began in June 1979 but did not conclude until June 1980. These tests were time constrained and limited in scope. A February 1980 report by the Army's Operational Test and Evaluation Agency (OTEA) states that:

-- "Time allocated for the test, six weeks, was such that the majority of the time was required to address the primary mission performance issue of individual vehicle hit capability which limited the gathering of data in other areas."

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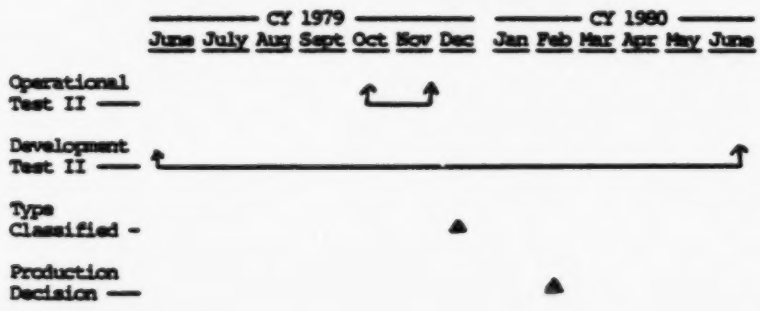
-- "The test was not able to fully test the supportability of the IFV system because the proposed supporting system was not fully developed in concept, doctrine, techniques, and essential equipment."

The primary objective of these tests, weapon testing, was even further limited by a potential carbon monoxide poisoning hazard and a safety restriction for the turret. The following list summarizes some of the major test limitations described in an Army Materiel Systems Analysis Activity (AMSAA) evaluation report.

Mobility ------ Tests limited.
Maintenance --- Not adequately demonstrated.
Survivability - Vulnerability tests deferred.
Logistics ----- Not adequately assessed.

In spite of test limitations the IFV/CFV was type classified as standard by the Army in December 1979 and full-scale production was initiated on February 1, 1980. The following chart depicts the early decision point with respect to the operational and developmental test status:

INITIAL IFV/CFV DEVELOPMENTAL/OPERATIONAL TEST PERIODS IN RELATION TO TYPE CLASSIFICATION AND PRODUCTION



Additional Tests are Planned For Production Vehicles

The Army is planning to conduct an extended series of tests to determine if the vehicles to be produced will meet design requirements. Some of the requirements such as reliability are more stringent for production vehicles than they were for the development vehicles tested. In the interim, the previously deferred vulnerability tests are being conducted on a development vehicle.

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An Initial Production Test (IPT) is planned to determine if production vehicles meet requirements and a Force Development Test and Experimentation (FDTE) is planned to assess IFV/CFV doctrine and tactics, maintainability, and logistics support. Because the IFV/CFV had already been approved for full-scale production, the Army did not plan for further tests by the independent Army test agencies. Instead, the program manager is responsible for the initial production tests and the Army user, the Infantry and Cavalry represented by the Training and Doctrine Command (TRADOC), is responsible for the Force Development Tests and Experimentation.

An OSD directed independent maintainability assessment by the Army testing agencies was subsequently added to Army test requirements because of concerns about IFV/CFV supportability in light of the previously limited testing.

Program Delays Expected

Although Army officials remain optimistic, program delays are occurring. The original program plans provided for initial production tests to begin in October 1981 and conclude in July 1982. The Initial Operating Capability (IOC) was scheduled to be achieved in October 1982 prior to the FDTE. This schedule has already been revised at least once and a change of procedure has been directed to permit completion and evaluation of the FDTE prior to initiating an operating capability. The Investigative Staff recently learned the test schedules are being revised again. An Army report dated August 25, 1981, now indicates that the IFV/CFV test vehicles scheduled for delivery in the first quarter of FY 1982 will not be available until the third quarter of FY 1982. The following chart indicates the delays and changes in the test schedules and resultant initial operating capability.

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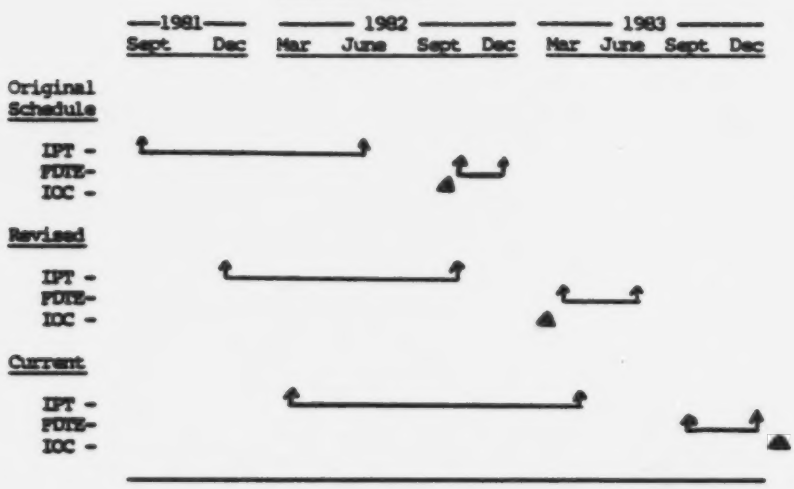
PROGRAM DELAYS



Even though the IFV/CFV vehicles were classified as standard in December 1979 and approved for full-scale production in February 1980, the chart indicates that testing will not be completed nor an initial operating capability achieved until approximately 4 years later in December 1983.

Deficiencies Identified in Future Tests Could Increase Costs

Final vulnerability tests and production vehicle tests may identify specification and requirement deficiencies. These deficiencies could result in design changes, additional support requirements and increased costs.

For example, if the IFV fails to meet the vulnerability requirement as emerging test results indicate, additional armor protection will have to be designed and added. Army and FMC officials acknowledged this situation and state that any new armor requirements would be at Government expense. Additionally, the Army may need to fund a retrofit program for the many vehicles already produced. By the time testing is completed, approximately 900 vehicles will have been produced. In essence, since the IFV/CFV has been classified as standard, it can be expected that the Government will bear the added cost for most changes.

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Conclusion

Based on an analysis of the IFV/CFV testing program, the Investigative Staff believes that the decision to classify these vehicles and proceed with full-scale production was made prematurely and that future test results will reveal required changes which may cause further program delay and increase costs. The comprehensive tests now planned seem to indicate that the Army only became concerned about realistically testing the IFV/CFV after the vehicle was approved for full-scale production.

Current Production Schedule Exceeds Contractors' Production Capacity

Although the Army has revised FMC's production schedule to compensate for a recent employees strike and initial production delays, the Investigative Staff believes that FMC will be approximately 6 months late in delivering its FY 1981 and 1982 IFV/CFV vehicles to the Army.

Employees Strike and Supplier Shortages Created Production Delays

In February 1980, the Army awarded a sole-source contract to FMC to build 100 IFV/CFV's with FY 1980 funds. The first production vehicle was delivered to the Army in May 1981. The 100th vehicle was scheduled for delivery in April 1982. In FY 1981, a second contract was awarded to FMC to build another 400 IFV/CFV's by April 1983.

Although FMC's employees went on strike in April 1981, FMC's management was able to hand-finish the partially completed first vehicle in order to meet the Army's May delivery date. Following the 11 week employees' strike, the Army and FMC developed a new production schedule which pushed back delivery of the 100th vehicle to June 1982. The revised production schedule anticipates that FMC will be able to overcome the production delays created by the strike and initial production startup problems and still meet the original April 1983 production schedule for the FY 1981 buy of 400 vehicles.

To assess the contractor's capacity to produce these vehicles as scheduled, the Investigative Staff visited FMC and several of its major subcontractors and suppliers--Hughes Aircraft, Hughes Helicopter Incorporated, and General Electric (GE) in late July and early August 1981.

FMC officials stated that they were still experiencing production problems primarily because of the late deliveries from their subcontractors and suppliers and internal difficulties associated with starting up their own production line. They advised the Investigative Staff that they expect to deliver the 10th vehicle

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to the Army in January 1982. However, if this estimate is correct, FMC's production will still be six vehicles behind the revised schedule. The Investigative Staff observed that FMC is far from being fully facilitized for producing the IFV/CFV. If FMC is able to produce 10 vehicles by January, FMC officials admit that they will be handmade rather than assembly line produced.

Hughes Aircraft having produced only five integrated sight units were 11 short of their contractual delivery schedule with FMC. Hughes officials stated that the shortage resulted from late deliveries by their vendors and therefore they have begun to dual source the optical items to assure production capacity compatible with FMC.

Hughes Helicopter, Inc., had not delivered any production 25mm guns which put them at least 2 months behind their contractual delivery schedule. Hughes Helicopter officials stated that these delays have resulted from initial facilitization and production startup problems. In addition, Hughes did not install two machine tools essential for production until the first week in August 1981.

General Electric delivered only 15 transmissions which put it 12 behind its contractual delivery schedule. GE officials believe that the causes for these delays--technical and delivery problems of the vendors--have been corrected and GE should be back on its original schedule by November 1981.

Although the supplier visited had produced sufficient components to meet FMC's revised production schedule, the Investigative Staff believes they were only able to stay in line with FMC's needs because FMC did not produce any vehicles during the 11-week strike. Prime and subcontractor officials failed to convince the Investigative Staff that they have overcome all of their production problems and can now provide FMC with components per their contractual delivery schedule.

Impact of Production Delays

The immediate impact of production delays by FMC and its subcontractors and suppliers is that FMC will not be able to deliver IFV/CFV vehicles within the appropriate funding delivery periods.

The following table compares the Army's estimated delivery dates with the Investigative Staff's estimates.

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COMPARISON OF ARMY'S AND INVESTIGATIVE STAFF'S ESTIMATED DELIVERY DATES FOR IFV/CFV

FY	QTY	Funded Delivery Period	Final Delivery Dates: Revised Army Estimate	Final Delivery Dates: Investigative Staff Estimate
1980 --	100	5/81-4/82	6/82	8/82
1981 --	400	5/82-4/83	4/83	10/83
1982 --	600	5/83-4/84	4/84	10/84

The Investigative Staff's estimates are based on observation of the FMC production facilities and conversations with officials of FMC and its suppliers. FMC is currently hand-assembling IFV/CFV vehicles and the production line is not expected to be operational until early 1982. Additionally, the Investigative Staff found that the subcontractors and vendors, although not affected by the strike, had adjusted their delivery schedules downward because they were unable to meet the original schedules.

Conclusion

According to the Army's revised production schedule, FMC is to be producing 50 vehicles per month beginning in March 1983. Therefore, because of a 6-month projected production slippage, the Investigative Staff estimates that FMC will probably be unable to deliver approximately 300 of the 600 vehicles to be purchased with FY 1982 funds within the funded delivery period.

Potential for Second Supplier Competition to Reduce Costs

Because of concerns about the cost of the IFV/CFV's, the House and Senate Armed Services Committees in May 1979 directed the Army and Secretary of Defense to conduct a comprehensive IFV/CFV program review to determine methods for cost reductions.

As a result, the Army initiated a number of actions which include:

-- The independent acquisition of major vehicle components which can be provided to the prime contractor as Government Furnished Equipment (GFE).

-- A study to determine the potential for obtaining a second contractor to produce the vehicles.

The Army is now planning to compete a number of major vehicle components. Contracts in the amount of $4.4 million were awarded to three contractors on June 4, 1981, to determine the feasibility of establishing a second source for IFV/CFV production. Although

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the concept of competition through a second supplier is valid, the present status of the IFV/CFV program may limit the potential for significant cost reductions in the near future. Some of the circumstances which may inhibit short-term cost reductions are:

-- A technical data package and specifications suitable for competition will not be available until sometime after completion of Initial Production Testing which is now scheduled for April 1983. Therefore, competition could not really begin until FY 1985, almost half way through the present program.

-- Approximately 3,000 of the 6,800 planned vehicles will have already been produced.

-- Major components with a value approximately equal to 47 percent of the vehicle costs are presently planned to be independently acquired by the Government and provided to the producer as GFE.

-- The Government will probably be required to provide monies for special tools and equipment to a second source contractor. ($16 million was required for special tooling at FMC.)

-- Other elements such as profit, overhead, and engineering support will be duplicated.

The Investigative Staff believes that realistically, the potential for significant savings as a result of a second producer of IFV/CFV vehicles is limited. Creation of an additional source of supply could, however, expand the industrial capacity for armored vehicles and provide the basis for competition in future programs.

FY 1982 IFV/CFV Program
Cost Reduction Possible

The Army's FY 1982 budget request was developed on the premise that FMC would be able to produce and deliver 600 IFV/CFV vehicles within the FY 1982 funded delivery period. The Investigative Staff believes the Army and FMC's estimates are overly optimistic and that the FY 1982 IFV/CFV program funds should be adjusted to reflect the probable reduced vehicle production and the need for Operation and Maintenance funds because of the delay in achieving an initial operational capability are questionable.

The Army's FY 1982 budget originally requested $674 million to procure 464 IFV/CFV vehicles. This request was subsequently amended to $868.9 million for 600 vehicles as follows:

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	(In Millions)
Vehicles	$652.1
PMO (Program Manager's Office)	1.4
Engineering, Government	3.2
Product Assurance, Government	.9
Test, Government	6.1
TMDE (Test, Management, and Diagnostic Equipment)	56.6
Peculiar Support Equipment	1.2
GFE (Government Furnished Equipment)	11.1
ECO's (Engineering Change Orders)	57.2
Value Engineering	20.0
Subtotal	$809.8
FY 1983 Advanced Procurement	59.1
TOTAL	$868.9

The Investigative Staff believes that FMC will only be able to produce and deliver approximately 300 of the scheduled 600 vehicles by the end of the FY 1982 funding period. Therefore, the Investigative Staff believes that the Army should reduce its FY 1982 procurement request for the IFV/CFV's by approximately $400 million to reflect a more realistic production schedule.

The Army's FY 1982 budget request for O&M funds for the IFV/CFV totalled $41.4 million, as follows:

	(In Millions)
General Purpose Forces (e.g., fuel, repair parts, etc.)	$ 13.3
Central Supply Activities (e.g., transportation, PM office, etc.)	15.0
Depot (e.g., maintenance support repair work)	7.5
Training base (e.g., TRADOC training)	4.4
Base Operations	1.2
Total	$41.4

Since the IFV/CFV testing has been delayed, the Initial Operational Capability date was revised from October 1982 to March 1983. The Investigative Staff, therefore, questions the need for $41 million for O&M expenses and believes the Army should reassess the FY 1982 O&M funding request for the IFV/CFV program.

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A summary of the above information was furnished to the Secretary of Defense for comment during his appearance before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. He was asked to provide a reply for the record.

RESPONSE

The report cited problems with the Infantry Fighting Vehicle (IFV). Requirements for the IFV, now the Bradley Fighting Vehicle System (BFVS), have been reviewed extensively by the Army, with major studies being conducted in 1976, 1977, and 1978. The Army considers the BFVS to be the most cost-effective solution to the total mission requirements it will face. The M113 Armored Personnel Carrier is not an adequate substitute because it lacks the mobility, firepower, and protection that is necessary to make it a companion for the M1 tank. Our prime contractor, FMC, is delivering the vehicle on schedule. The corporate leadership has unequivocably stated they can and will meet delivery schedules.

COMMENT

The Army contends that:

-- Based on major studies in 1976, 1977, and 1978, the BFVS are considered to be the most cost-effective solution to the total mission requirements.

   These vehicles were "type-classified" by the Army after only limited prototype testing. A Force Development Test and Experimentation (FDTE) to assess IFV/CFV doctrine, tactics, maintainability, and logistic support is not scheduled to begin until September 1983. Even prior to this testing, the effectiveness of the cavalry vehicles for its scout role is being questioned by senior cavalry officers because of vision restrictions, exposure of troops, and hazards to troops because of vehicle design. As a result, significant design changes are being considered as well as potential substitution of another armored vehicle for the cavalry role.

-- The M113 Armored Personnel Carrier is not an acceptable substitute because it lacks the mobility, firepower, and protection necessary to make it a companion for the M1 tank.

   The Army developed and tested a modification to the M113 Armored Personnel Carrier to improve its speed, mobility, and agility to level commensurate to the M1 tank. This option, however, was reportedly never evaluated prior to the development of the new Infantry Fighting Vehicle. As a "companion" to the M1 tank, the IFV/CFV have serious shortcomings such as: no comparable troop armor protection, a higher physical profile, less overall armor protection,

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and the inability to transport a standard Army infantry squad. Only 9 troops can be transported instead of the standard 11-man squad. The IFV and the troops carried into battle with the M1 are therefore very vulnerable. If the requirement is to transport troops to the battlefield under armor protection, it can be done significantly cheaper and more effectively with an improved M113.

-- The contractor, FMC Corps, is delivering the vehicle on schedule, and corporate leadership has unequivocably stated they can and will meet delivery schedules.

Production problems have developed, and as of February 1982, production had already slipped by 3 months. Only 20 of 55 scheduled vehicles had been delivered. As of this date, the vehicle assembly was not scheduled to be fully operational until the summer of 1982. Production problems were expected to cause a $17 million cost overrun.

USE

In addition, the Appropriations Committee in its report of November 16, 1981, on the FY 1982 Department of Defense appropriation bill, directed the Army to conduct side-by-side field tests of the FVS with a wide range of vehicles that could wholly or in conjunction with other systems perform the FVS mission. These systems should include the modified M113 as recommended by the Army Materiel Development and Readiness Command, the Improved TOW vehicle, the AIFV and commercial light armored vehicles being developed by the Army and Marine Corps, as well as any other systems considered appropriate. These tests should focus on both performance and cost factors and consider limitations on any system performing more than one function simultaneously.

The Army will notify the Committee of its planned structure for the field test and provide test results in time for the Committee's deliberations on the FY 1983 budget request.

Report of April 13, 1982

This is a program status update on the Infantry and Cavalry Fighting Vehicle Program now known as the M-2 (Infantry) and M-3 (Cavalry) Bradley Fighting Vehicles. Although the program was in an early production stage, the initial report noted a number of problems and predicted that the planned production schedule could not be met. The information set forth in the attached investigative update is intended to bring forward some of the more significant problems noted and to provide current information for an ongoing assessment. It is, therefore, not a detailed analysis of these problems or of the program as a whole. This update addresses production problems, potential delays in deliveries, testing and fielding, and design changes due to potential operational deficiencies.

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Specifically discussed are:

-- As predicted, the first year production has slipped by 3 months, and the initial buy of 100 vehicles will not be delivered until at least August 1982.

-- Due to the contractors' continuing assembly line and parts manufacturing problems, there is the potential for a slippage of several more months.

-- Because of interim production methods currently being employed, the contractor is expected to incur a 17 percent cost overrun, thereby increasing the initial FY 1981 production contract from a target cost of $152.5 million to $169.8 million.

-- Anticipated production delays will likely result in the late delivery of vehicles, which will adversely impact scheduled initial production testing and prevent achievement of a December 1983 IOC.

-- Both the M-2 and M-3 were type-classified after only limited prototype testing. Currently, due to inherent design deficiencies, there is concern within the Army as to the suitability of the M-3 (Cavalry Scout) for its intended role. Correction of these deficiencies will apparently require significant and costly hardware design changes which are being discussed. Actual replacement of the M-3 with the Mobile Protected Gun (MPG), a vehicle still under development, is also being considered. An assessment of fighting vehicle doctrine, tactics, maintainability, and logistics support is not scheduled until September 1983, and by that time, 620 M-3's will have been purchased at a cost of over $1 billion.

-- The Army AAO for the M-2 and M-3 is 17,083 vehicles although, reportedly due to initial funding constraints, a procurement objective of only 6,882 vehicles was established through 1989. As of February 1981, the estimated program cost to reach this objective was $12.7 billion. To meet the AAO and eliminate the need for continued use of the M113 personnel carrier (alleged by the Army to be inadequate) an additional 10,201 vehicles at an increased program cost of $19.8 billion (using current vehicle cost figures) will be required.

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BRADLEY FIGHTING VEHICLE SYSTEMS
PROGRAM STATUS UPDATE

Production Problems Continue

Although the first Bradley Fighting Vehicle was delivered in May 1981 as planned, the scheduled delivery of the first year production vehicles has now slipped by 3 months from the original schedule. FMC, the prime contractor has experienced production startup problems and has delivered only 20 vehicles to the Army from May 1981 through February 1982. This is 35 vehicles less than the 55 originally scheduled for this period. As a result, the first year buy of 100 vehicles will not be delivered until at least August 1982 as predicted in the previous report.

Army and contractor officials stated that the production startup problems involve miscellaneous vehicle parts manufactured by FMC. Army and FMC officials have reported that many of these parts were not fitting properly and had to be "reworked" and new drawings made. During an Investigative Staff visit on January 28, 1982, it was observed that the vehicle assembly line was still not fully operational and FMC officials advised it would not be until the summer of 1982. FMC is scheduled to deliver 286 vehicles between March 1982 and February 1983. To achieve this delivery schedule and makeup for past slippage, the monthly production rate must be sharply increased over that originally planned and a revised production schedule has been developed. FMC officials are optimistic about ramping-up production to meet the revised schedule. Army officials are more cautious and view the meeting of scheduled deliveries in the months of April, May, and June as critical to completing the ramp-up as planned. Based on past history, the current status of the assembly line and the parts manufacturing process, there is the potential for a slippage of several more months during the accelerated "ramp-up" to 50 vehicles per month.

Because of the interim production methods currently being employed, FMC is expected to incur a 17 percent cost overrun thereby causing an increase in the initial production contract (FY 1981) from the target cost of $152.5 million to $169.8 million. Any additional overruns could result in a funding problem and a potential reduction in the quantity of vehicles procured since the program reportedly has only $5 million remaining in the appropriated funding for the FY 1981 buy. FY 1982 funds were provided to produce 600 vehicles and FY 1983 funds are requested to produce another 600 vehicles.

Production Delays Could Delay
Army Testing and Fielding Schedules

Production delays could result in the late delivery of vehicles for required testing which must be completed before the M2/M3 Fighting Vehicles can be fielded. An Initial Production Test

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(IPT) is scheduled to start in June 1982 to determine if production vehicles meet specification requirements. Any delay in completing these tests would prevent the Army from achieving an initial operating capability in December 1983, as planned. Additionally, the makeshift production process discussed earlier raises doubt as to whether the vehicles to be tested during the limited initial production test will be representative of the vehicles produced by the final production process. Most of the vehicles to be tested will not have been made on a fully operational assembly line and many of their parts will have been customized, that is "reworked." Consequently, these vehicles may not be representative of actual production line vehicle quality.

Army to Decide on a Second Production Source in 1982

Because of previous concerns about the high cost of the Bradley Fighting Vehicles, the Congress in 1979, directed the Army to investigate potential methods for cost reductions. One of the methods the Army considered was the potential for a second source producer of the vehicles and industry proposals were requested. Two firms-Bowen-McLoughlin-York and Pacific Car and Foundry--have submitted proposals to become a second producer. The Army is now evaluating the proposals and expects to make a decision regarding them by November 1982. The Army's second source plans were economically justified on vehicle procurements at a rate of 1,080 a year (90 per month). Although the original plan called for this quantity to be produced in FY 1985, current plans based on program changes now indicate that this rate of production is not scheduled until FY 1988. Since the Army estimates that establishing a second producer would require an additional $72 million in FY 1983 funds, Army officials acknowledge that they will not establish a second producer unless there is an increase in the budget for the total program and currently planned procurement quantities are increased. Currently, there are no funds in the Army's FY 1983 budget request to establish a second source. The potential for a second source supplier therefore appears to be minimal.

Cavalry Fighting Vehicle May be Unsuitable for its Intended Role

Some officials in the armor community consider the Cavalry Fighting Vehicle to be generally unsuitable for its cavalry scouting role. There is reportedly a great deal of concern regarding the effective and safe operation of the vehicle in combat situations. Vision from the rear of the vehicle is severely restricted which limits its utility as a scout vehicle.

In order to effectively see out of the vehicle, crew members in the rear of the vehicle must open the top hatch and look out over it, exposing the upper half of their bodies to enemy fire. The danger is compounded if the turret and gun barrel are rotated to the rear of the vehicle when this activity is taking place since

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the 25mm gun barrel, if not sufficiently elevated, will strike the crewman and/or the open hatch with unpleasant consequences. Army officials stated that they are aware of the problem and are discussing solutions. A possible solution is to redesign the top hatch to pop up so a crewman could look out. Another serious problem is the limited ability of the driver to see when the swim barrier is erected. (This problem exists in the Infantry Fighting Vehicle as well.) Solutions to this problem are also being considered. These corrections will apparently require significant hardware design changes. At the present time, alternative corrective actions are being discussed within the Army but no design changes have been authorized.

Because of the limited range of vision from within the vehicle and also its high silhouette, consideration is being given to replacing this vehicle with the Mobile Protected Gun (MPG) armored vehicle presently being developed. Doubtless contributing to the controversy over operational suitability is the fact that the Cavalry Fighting Vehicle (and the IFV) was type classified after only limited prototype testing. A Force Development Test and Experimentation (FDTE) is scheduled to start in September 1983 to assess IFV/CFV doctrine and tactics, maintainability, and logistics support. By that time, however, 620 Cavalry Fighting Vehicle's will have been purchased at a cost of over $1 billion.

Need for M-2/M-3 Remains Questionable

Additionally, as noted in the February 1982, Investigative Staff report on the Procurement Practices of the Department of Defense many armored vehicles are being developed at great cost, in apparent duplication and no master plan exists for the modernization of the armored force. The Fighting Vehicle program is the result of a development program that is about 20 years old. Now that the M2/M3 fighting vehicles are finally in production, the Army's needs appear to be changing and a new armored vehicle requirements study is reportedly being initiated by the Army. At the same time, the Army is involved in developing lighter, more deployable, and less costly armored personnel carriers and "fighting vehicles." The M2/M3 vehicles were never seriously considered for this new role because they cannot be transported via C130 and C141B aircraft (without disassembly) and they are too costly. The actual need for M2/M3 Bradley Fighting Vehicles as well as the quantities being planned appears to be questionable.

The Army's authorized acquisition objective (AAO) for the M2/M3 Bradley Fighting Vehicles is 17,083 vehicles. Reportedly due to initial funding constraints, the Army established an initial procurement objective of only 6,882 M2/M3 vehicles through 1989. As of February 1981, the total program cost was estimated to be $12.7 billion to produce the 6,882 vehicles through 1989. To meet its AAO and eliminate the continued need for and use of M113

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the Army will need to buy an additional 10,201 vehicles. This would increase program costs by $19.8 billion to a total of $32.5 billion using current vehicle cost figures.

Summary

Although the Fighting Vehicle program has been ongoing for several years, and vehicle production reportedly began in 1980 with the first production IFV delivered in May 1981, the program is still in its early stages and full-scale production will not be achieved for several more months. All of the first year's buy (FY 1980) of vehicles will not be received until August 1982. Both the FMC Project Manager and the Army Program Manager advised the Investigative Staff that the next several months will be critical ones with regard to vehicle production. Any serious problems encountered during this time will seriously delay the production schedule. Also significant is the fact that a great deal of production and operational suitability testing has yet to be done. Experience with other armor programs indicates that as the program continues to mature, other problems can be expected to occur.

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Report of September 23, 1981

LHA CLASS SHIP, AUTOMATED PROPULSION CONTROL SYSTEM

An examination of the procurement of the LHA class amphibious assault ships shows that the Navy's decision to remove the automated propulsion control system was premature, should not have been made, and has cost an extra $30 million. A similar project involving the removal of waste heat boilers from DD-963 class ships has been recommended by the Senior Navy Steering Board over the objections of in-house engineering personnel and, if implemented, could cost an additional $1 billion.

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Background

The LHA class of amphibious assault ships are very large ships (over 820 feet long, 39,300-ton displacement), designed and built for transporting some 1,900 troops and support equipment to an offshore point for amphibious and airborne assault. The ship carries over 30 helicopters or Harrier aircraft, as well as several smaller assault (landing craft) boats. The latter are carried in, and launched from, a floodable well deck located inside the aft section of the ship, while aircraft are deployed from a carrier-type deck after being raised from a lower level hangar deck.

When originally conceptualized in the mid-1960's, the ships were procured in a manner unique in the acquisition of Navy ships, i.e., via a Total Package Procurement, a method advocated by a former Secretary of Defense. Under this procurement method, the Navy initially stated its needs in terms of relatively brief performance specifications. The procurement was conducted in two phases. The first phase, concept formulation, attracted three bidders, with Ingalls Shipbuilding, Pascagoula, Mississippi, a division of Litton Industries, winning the contract for the follow-on phase. The second phase was negotiated with Ingalls for the detailed design and specifications for the ship, which became the LHA class. The design included the automated propulsion control system (APS) which is now being removed from all five ships in the class. One of the key design concepts was the ships ability to operate with minimal manning. Although new to the Navy, automation of the propulsion control system was seen as a method of reducing life cycle manpower costs.

The first ship, the LHA-1 (TARAWA), was commissioned in May 1976, some 5 years after construction began. LHA-2 through -5 were commissioned in the ensuing years through May 1980. Although initially fraught with an exceedingly high number of problems, most of the personnel interviewed by the Investigative Staff felt the ship to be quite capable of performing the mission for which it was intended. Because of the initial problems with the APS, some of which continued for some time, the Navy decided to rectify the situation by replacing the automated system with an older, but proven reliable, pneumatic system--a system with which the Navy was much more familiar.

The Investigative Staff's inquiry included extensive interviews with personnel from organizations with differing perspectives of the LHA's and the automated propulsion control system. They included personnel from the Naval Sea Systems Command and the Navy Board of Inspection and Survey; the captains and crews (Engineering Department) of LHA-1 and LHA-5; a former captain of LHA-3;

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personnel of the Long Beach Naval Shipyard, which is responsible for the replacement of the APS in LHA-1, -3, and -5; training personnel and former LHA crew members at the Service School Command, Naval Training Center, San Diego; the present commander of the Naval Amphibious Group, Eastern Pacific, located in San Diego; the present commander of the Naval Amphibious Group, Eastern Pacific, located in San Diego; technical personnel of the Supervisor of Shipbuilding activity at Ingalls Shipbuilding, Pascagoula, Mississippi; and management and technical personnel of Ingalls Shipbuilding and TANO Corporation (the designer and manufacturer of the APS), New Orleans, Louisiana.

Of particular issue in this study is whether the automated propulsion control system should have been removed from the LHA's and whether the acquisition met the requirements originally established by the Navy.

The Problem

The propulsion control system consists, basically, of the boilers, fuel and burner systems, and the sensors, indicators, alarms, and controls necessary to monitor and operate the propulsion unit. In the case of the LHA ships, the propulsion control system was automated to a very high degree. The system was built under subcontract from Ingalls Shipbuilding to TANO Corporation, a company specializing in automated ship control systems.

The TANO system installed aboard the LHA's is a highly complex system of late 1960's technology. It consists of a large number of sensing and control devices located in the ship's machinery spaces, and control consoles located in fore and aft enclosed operating stations (EOS). In addition, another console is located on the bridge. In retrospect, it appears that the system was overly complex, which, in turn, contributed to the host of problems experienced, especially on the LHA-1. A $400,000 (total) modification package was procured for the five ships; however, the removal program preempted its installation on all but two. On the other three, the TANO APS has been replaced by the pneumatic system; however, on the two ships where it was installed, the APS modification package did improve the situation considerably.

The principal manifestation of the problem with the APS was the fact that the propulsion system would completely shut down under certain conditions, thereby eliminating the ability to control power to the screws. Obviously, in certain situation, e.g., docking, underway replenishment at sea, etc., the sudden loss of ability to control headway or sternway (backing) could have disastrous results. The Investigative Staff was not made aware of any cases where damage was incurred as a result of any of the five LHA's going "dead in the water;" however, numerous instances of automatic shutdown of at least one boiler were mentioned, especially in the early days of LHA-1 and, to a lesser extent, on LHA-2.

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The initial days of LHA-1 were fraught with problems. The ship was recommended for delivery to the Navy in April 1976 by the Navy's Board of Inspection and Survey even though some 2,700 deficiencies had been noted during acceptance trials. Several Navy officials were quite vocal about the inordinately high number of deficiencies, including many associated with the APS. Because the APS is extremely critical to safe operation not only under normal conditions, but even more so in a hostile battle environment, and the fact that the propulsion system continued to have problems including shutdown, senior Navy officials began to have second thoughts on the wisdom of automated systems in the naval environment. As a result, the Vice Chief of Naval Operations, upon the recommendation of the Senior Navy Steering Board (SNSB), which had been tasked to evaluate LHA-1 problems, advised in an October 1977 letter that: "It is the intention of the Chief of Naval Operations to authorize the replacement of the present automatic propulsion control system at the earliest practicable time and subordinate commands should plan accordingly." Regardless of the aggravations which precipitated this decision, the Investigative Staff believes the decision was ill advised and premature.

Why the Decision

Although the SNSB may have recommended the APS pullout prematurely and against the judgment and advice of some Naval Sea Systems Command engineering personnel who had also been tasked to evaluate the situation, there were definite problems with the APS hardware itself and with its operation and maintenance. It appears, however, that all were correctable and that some of the reasons proffered for removing the system, especially regarding personnel, were shallow, if not incorrect. This conclusion is based upon the fact that the majority of the problems were associated with LHA-1. By the time LHA-3 was commissioned, the problems had, for the most part, been corrected. The following is a synopsis of the problems.

Hardware Malfunctions

The TAMO APS measures, monitors, and controls all aspects of a ship's propulsion system. According to officials at the Long Beach Naval Shipyard, some 1,200 propulsion plant parameters are monitored, indicating, to some extent, the complexity of the system. Most of the sensing and control devices are located in a hostile environment of high heat and humidity; i.e., in the ship's machinery spaces. Therefore, these devices were susceptible to damage caused, for example, by steam leakage. Spurious alarm signals were rampant; therefore, little credence could be attached to whether the alarm indicated an out-of-tolerance condition or a false warning. Some of the original equipment in the automated system, e.g., valves, were found to be undependable, with the resupply system for such nonstandard parts being less than

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responsive. Some inherent (but correctable) design deficiencies were experienced in the system as well. In essence, and APS had numerous "bugs" which required time to correct.

The Investigative Staff interviewed no one who felt that mechanical/electronic/electric problems were not a major fault of the early ships. Because of at least three factors, i.e., the complexity of the APS, its early propensity to malfunction, and the Navy's lack of understanding of the system as a whole, the SNSB's concern is understandable, particularly when the "right" combination of errors resulted in complete propulsion system shutdown, over which the ship's bridge had little or no control. This point was stressed frequently by Navy officials--a reasonable point of view if a "fix" could not have been developed. This is where reason appears to have ended. The situation has been corrected and seems to be a safe and reasonable answer to the system's problems; however, the Navy is faced with what now appears to have been an ill-advised decision. It is also faced with the need to perpetuate its "justification" in spite of the fact that new Navy ships of other classes are now being constructed with automated propulsion systems.

Personnel Problems

Personnel problems were perhaps the second greatest contributor to LHA-1's difficulties. Initial training of the first crew was considered inadequate and apparently not geared to the level of persons who were to receive it. Personnel responsible for operations felt that enlisted personnel involved in maintenance should receive more comprehensive and useful training. When feedback was introduced to the Navy, personnel of the Service School Command in San Diego restructured the course to correct the shortcomings of the original contractor-developed and -instructed course.

A second problem relating to training is the fact that the crew of the LHA-1 did not put the training to use until over a year after it was received due to delays in the shipbuilding program at Ingalls. During this period, the training became "cold" and, further, a number of those who attended the course were reassigned. As a result, the Investigative Staff was advised, when the LHA-1 went to sea, it sailed with an ill-trained and demoralized crew. The morale problems were attributed, in part, to a less than positively oriented management (command) staff, especially in the engineering department. Several interviewees indicated that a combination of the two factors was a major contributor to operator errors, which only served to compound the hardware problems.

The official Navy position in regard to training of enlisted personnel for the APS is considered to be irrational. The Navy believes it is impossible to train enlisted personnel to a point

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where they can operate and maintain the LHA APS. The Navy points to experience (which had to be with the LHA-1) as proof that the job could not be done. Given the aforementioned personnel and initial hardware problems, the Investigative Staff believes that this is a spurious data base upon which to make the all-encompassing decision--the system cannot be fleet maintained. The experience of the LHA-3, which operated in the automatic mode 95 percent of its 8 months at sea with no uncorrectable problems further illustrates the fallacy of this position.

The Navy's argument is further discredited by the fact that another course is being taught at the Service School Command for another APS which has been installed on the SPRUANCE (DD-963) class destroyers now being completed by Ingalls at Pascagoula. The CG-47, TICONDEROGA, the first of a new class of gas turbine cruisers, is another example of where the Navy is outfitting its ships with automated propulsion control systems. It may be argued that these systems are simpler because control of gas turbine propulsion systems is less complicated; however, a new class of AO's (oilers), which are steam turbine ships (as are the LHA's), are also being built with automated systems. Obviously, all of these ships must have trained operations and maintenance personnel, and the required schools have been instituted for this purpose. Counter to the Navy's idea that personnel could not be trained for the LHA system, the course is still being taught in San Diego (to be phased out in April 1982). Obviously, the Navy's position regarding training and the LHA's is contradictory to its plans for automated propulsion control systems in its new generation of ships.

It was mentioned several times that the "'gator, Navy," as the Amphibious Navy (LHA users) is referred to, does not have a high priority attached to its personnel requirements. The "nuclear and carrier Navies," it was said, do have priority. Ships like the LHA receive what is left over, corroborating, to some extent, what the Navy may have been delicately trying to say--higher potential personnel are skimmed off for assignments to other than LHA-type ships. Therefore, there may not be enough competent personnel to go around. The Navy further states that electronic and communications technician positions are ones requiring inherent capability and skill. This is undoubtedly true; however, the Investigative Staff was advised that assignment of personnel to the ships was not always in accordance with the skill levels needed. Some replacement personnel were being assigned to the ships without any APS training. Others were assigned with only A-level (entry level) training rather than training at the petty officer level which was required. Naturally, training and assignment malpractices only further handicap an already tenuous situation.

The Investigative Staff believes that making an issue out of training is merely a smokescreen for the removal of the APS. The Navy had every intention of continuing its use of automated

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propulsion control systems. Without APS, the LHA is turning out to be an anomaly as far as new Navy ships are concerned. It is true that the Navy did have to "set up special schools to train operators and maintenance technicians in the LHA-1 class unique equipment and systems," but that is no more or less a requirement than what has been and will be done for the other APS's entering the Navy inventory. Further, cost of training is not a substantive argument as operations and maintenance personnel must be trained for the LHA's regardless of whether they are pneumatic system technicians or electronic system technicians. In addition, a TANO APS simulator was provided to the Navy and is in operation at the Service School Command; therefore, a major cost for this training aid had to be considered a sunk cost when the decision was made.

In summary, although there was clearly inadequate training provided during the early LHA-1 era, the scrapping of the APS in the LHA class ships, based largely on the premise that a proper training program could not be developed and instructed, is considered a devious excuse for the action taken.

Cost of the APS Replacement

Hardware

The original cost of the TANO APS for the five ships was approximately $11 million. The replacement action, or Ship Alteration 165, as it is referred to by the Navy, will cost between $6.5 and $7.6 million per ship at the Long Beach Naval Shipyard for LHA-1, -3, and -5. This represents some 25,000 man-days of effort, and in the case of the LHA-1, which will begin a scheduled overhaul this year, approximately 12 percent of the overhaul package. Conservative estimates are that the five-ship APS replacement program will cost approximately $30 million versus the $11 million for the original systems.

Personnel

It is interesting to note that the manpower needs for the LHA-s have increased significantly over the years. In 1973, when the first ship was under construction, the ship's complement was to be 678 enlisted men and 40-plus officers. Initially, 26 personnel were to be involved with the propulsion system. Manning in numerous areas has increased steadily over the years. At this time, the ships are manned by 837 enlisted Navy personnel and 54 officers. Four marines are also assigned in a liaison capacity. The Investigative Staff was informed that the removal of the APS necessitated the addition of 6 new watch stations, for a total of 18 personnel (6 stations times 3 shifts per station). This raises the manning currently required for the propulsion system from 45 to 63 personnel.

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One senior Navy official felt the LHA's are still "woefully undermanned" for sustained, round-the-clock operations in a battle environment. He further indicated that while it might be a natural supposition that Navy ships could operate with less people because of automation, this philosophy does not recognize the frailties of automated systems in a hostile and extremely demanding environment. He believed, without equivocation, that the ship has the potential for doing what it is supposed to do; however, his reservations regarding manning may be quite justified and may merit further objective evaluation. This is supported by the obvious fact that the original minimal manning concept has not proven to be practical.

Lessons Learned

APS Removal Premature

The decision by the Senior Navy Steering Board to remove the LHA's automated propulsion system is judged by many to have been premature. Several persons indicated that the removal recommendation was based, to a large extent, on the influence of an engineering consultant firm which has a senior representative who meets with the board. It was alleged that the firm exercised considerably more influence over the board than did the Navy's own engineering personnel who had likewise been tasked to evaluate the APS. Most importantly, the in-house expertise felt that the system should not have been removed, especially considering that the decision was made after only approximately 17 months of experience, limited to only one ship. Although clearly from a "ship driver's" point of view, the problems of the APS, and worse, the out-of-control situation that could be caused by a malfunctioning APS, are of no small consequence, 17 months is insufficient time to allow the "bugs" to be worked out of a system of this size and complexity. The Investigative Staff was advised that neither Ingalls, TANO, nor the Navy's Supervisor of Shipbuilding personnel at Pascagoula were consulted regarding any prognosis for improvement of the system or whether it should be removed. Experience has proven that the system could function properly.

The Investigative Staff concludes that the SNSB was unduly influenced to remove the APS and questions why the decision was made over the objections of its own professional engineering personnel. In addition, no evidence of any cost analysis was presented.

If there were some "saving grace" to the APS removal, it would be that the Navy had learned a lesson about hasty and perhaps ill-advised corrective action to shipboard problems. Unfortunately, this is not the case because at this time there is another retrofit project pending. This too has been recommended by the Senior Navy Steering Board and, similarly, as a result of

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a study by the same consulting firm which allegedly recommended the removal of the APS. In addition, the cost of this particular retrofit project far exceeds the cost of the APS removal. Once again, the decision is apparently being made against the advice of engineering professionals within the Naval Sea Systems Command.

The project involves the removal of waste heat boilers from 30 gas turbine DD-963 class ships and their conversion to become all-electric ships (the waste heat boilers are used to generate steam for various hotel services and for electrical power generation). The Investigative Staff was told that the conversion project is estimated to cost from $0.5 to $1.0 billion, with an annual additional fuel cost (1980 prices) for the 30 ships amounting to some $60 million annually, or $1.8 billion over the ships' life cycle--hardly an indication of lessons learned.

Training Must Be Timely and Coordinated

Lack of proper training of LHA APS operating and maintenance personnel has been a major contributing factor to the APS removal. In addition to the initial problem of inadequately "scoped" training for the needs to be met, it appears that training and assignment personnel were not properly "in the loop" to insure that the proper people were available and trained for the ships. Although the initial course was admittedly poor, the feedback to the Service School Command was slow and inadequate. Apparently the Navy has learned from this experience because a new APS course for equipment to be installed in a new class of ships has been developed in close coordination with the APS vendor.

Land-Based Testing of New Concepts Is Required

The LHA was an extremely complex system and one that was new to the Navy. In spite of this, it was never tested in an environment which could simulate Navy operating conditions. As a result, the debugging or shakedown period was experienced during the initial months of its use in ships at sea--an undisputed fiasco.

The fact that the system was never tested in a land-based environment to determine its potential for successful employment aboard Navy ships may be due, in part, to the Total Package Procurement method of acquisition. Under "normal" circumstances, the Navy would decide what type of system to install in a given class of ship. In certain cases, the equipment might even be Government furnished. However, in this case, the Navy initially provided only general performance oriented specifications. The contractor (Ingalls) responded in accordance with the minimal manning concept, proposing an automated propulsion control system. A preinstallation, land-based test was not part of the package.

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Several Navy officials mentioned the failure to test the system in an environment where it could be "wrung out" as the baseline for the problems that were later experienced. This is undoubtedly the case; however, it appears that this is a lesson the Navy has learned, as a new APS for the LSD-41 class is being tested by the Navy at the Naval Ship System Engineering Station in Philadelphia. If there is a broader application of the knowledge gained, it is that other new concepts should have a baseline of proven experience, or they should be tested in a noncritical environment prior to installation in the real world, shipboard environment.

Conclusion

Considering the very favorable opinions of the senior naval officers who command the LHA's and the "Amphibious Navy," from an acquisition standpoint, it is believed the contractor met the general requirements established by the Navy in its original specifications. It is questionable, however, that the Total Package Procurement method is the appropriate method to acquire Navy ships as too much latitude is left to the contractor as to how requirements are to be met.

The Investigative Staff also concludes that despite the problems with the automated propulsion control system on the LHA-class ships, the removal order was premature and should not have been issued. The concerns of senior Navy officials regarding the APS and the safety of the ship are legitimate but are considered to have been given too much weight in that they resulted in what experience has proven (to most) to be an ill-advised decision. The Investigative Staff questions whether too much credence is being placed on the judgment of outside consultants to the Senior Navy Steering Board considering: (1) the APS problems were, for the most part, corrected or under control by the time LHA-3 was operational, in spite of the dire initial predictions, and (2) another retrofit project (waste heat boiler removal from the DD-963 class ships) is likewise being recommended to the board--again, over the objections of in-house engineering professionals. It therefore appears that the conservative and perhaps totally safe answer is being chosen by the board without an objective evaluation of opposing viewpoints. Conservatively, the APS replacement has cost some $30 million. Another questionable recommendation and overly hasty decision may result in the unnecessary expenditure of over $2 billion. Considering the disparate positions on the DD-963 waste heat boilers, the Navy may be well advised to look into the matter more deeply to insure that this is the most reasonable and cost-effective solution.

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USE

A summary of this information was provided to the Secretary of Defense for comment during his appearance in hearings before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The following response was provided for the record.

RESPONSE

1. The Automatic Propulsion Control System (APS) installed on the five TARAWA Class LHA's during construction is an electronic-pneumatic system intended to provide automatic propulsion control from the bridge. This system is significantly more complicated than any other marine steam plant control system either Navy or commercial.

2. Operating experience since delivery of the first ship in 1976 has shown the system to be unreliable and unnecessarily complex. The plant responds automatically to plant conditions and can start up or stop equipment without human commands. At times, the APS has completely shut down the plant due to false sensor readings. The ability to manually control the plant during casualty control or battle conditions is inadequate.

3. The original APS system was procured under the "total package procurement" concept and the cost of the segment of the ship is unknown. The system was chosen by the contractor, not the Navy, under this procurement concept.

4. The degree of automation in the APS system did not provide a payoff in reduced manning levels. The skill levels of the average sailor are inadequate to maintain the complex APS system. Special schools had to be established to train sailors in operation and maintenance of the system. Over the 30-35 year life of these ships, the costs of running special schools to support just five ships is significant.

5. The original APS system is being replaced with a Navy Standard Automatic Combustion Control (ACC)/Feedwater Control (FWC)/Feed Pump Control (FPC) pneumatic control system, the same as that used on many other classes of Navy ships. Equipments used are those for which parts support already exists in the Navy Supply System. Existing Navy schools are appropriate for crew training, and engineering personnel can be transferred to and from other Navy ships with similar systems without expensive retraining. This replacement of the APS system was approved by CNO and is considered to be the most cost-effective, long-term solution to the problems that have been experienced.

6. The APS replacement has been completed on three ships and a fourth is currently receiving the alteration. The fifth ship of the class is scheduled for APS replacement beginning in July 1982. Operating experience on the ships that have received the replacement is outstandihg, with a very high degree of reliability.

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COMMENT

The Navy's rebuttal to the Investigative Staff's report represents to a large extent a reiteration of the reasoning proffered for the Automated Propulsion Control System (APS) "swap-out" in the first place. If problems aboard the LHA's had continued at the rate and magnitude that were being experienced in the early days (circa 1976), the Navy's decision to remove the APS may have been advisable. This was not the case, however. The system modifications and learning curve experience caused the situation to improve considerably. Other arguments in the Navy's rebuttal, e.g., skill levels inadequate to meet APS maintenance requirements, were questioned, addressed, and refuted in the Investigative Staff's report, except one--the Navy's statement of fact that the CNO decision was the "most cost-effective, long-term solution." Evidence that this was to be the case was not presented during the course of the investigation.

Report of February 26, 1982

This report on the removal of waste heat boilers from the DD-963 (SPRUANCE) class destroyers was made by direction of the Committee.

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SUMMARY

The intent of this investigation was to determine the type and extent of problems the Navy had experienced with waste heat boilers (WHB's) installed on its DD-963 class (SPRUANCE) destroyers, and whether the decision to remove the boilers was justifiable and the proposed solution cost-effective.

Waste heat boilers are fueled by exhaust gas heat from the gas turbines which power the ship's electrical generators. From this heat, the boilers produce steam which is used for a number of purposes such as distilling water, heating fuel and lubricating oil, for hotel services, etc. Because the WHB's use by-product energy (exhaust gas), this reclamation of otherwise wasted energy results in essentially "free" power. Removal of the WHB's would require an alternate source to provide this essential power. The Navy has proposed a fourth gas turbine powered generator and electric (versus steam) auxiliary equipment. The Navy refers to the DD-963 class when configured with the fourth generator and electric auxiliaries as an all-electric ship.

Many personnel were interviewed at various levels within the Navy as well as several civil sector firms which have been associated with waste heat recovery systems. Although the problems were clearly recognized by all those interviewed, many believed that waste heat recovery in the form of an improved WHB was an acceptable "fix" even though the all-electric ship was recognized as a desirable but probably overly costly solution to the problem.

The Problem

Waste heat recovery is neither a new nor a complicated phenomenon; however, the WHB aboard the DD-963 class, manufactured by Conseco, Incorporated, of Medford, Wisconsin, was designed to be compact and to require very little maintenance. It was believed that one of the main elements of the boilers, the heat exchanger tube bundles, would last for many years, perhaps for the life of the ship. This has not turned out to be the case, however. Tubes within the bundles have corroded severely and consequently developed leaks necessitating shutdown of the turbine and generator which are coupled directly to the WHB. Because the frequency of tube leaks and other maintenance problems was so high, ships were often without one generator, and occasionally without two. The problem is further compounded by extremely poor accessibility of the WHB and its ancillary parts in that repairs require an inordinately long time to complete. Therefore, the ships become vulnerable to going "dead in the water." With two generators out, the ship essentially loses its mission capability and must return to port until repairs can be completed. Although the boiler tubes were the most problematical from a maintenance standpoint, other elements of the system were also troublesome;

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e.g., pumps, the steam separator, valves, etc. Without doubt, the Conseco WHB's were a serious problem within the SPRUANCE class. Decisive action was necessary.

The Navy's Decision

Due to the seriousness of the problems experienced on the DD-963, principally with the WHB systems, but also including some others such as the Anti-Submarine Rocket (ASROC) Weapons Handling System and the 400 Hz Static Frequency Converters, the Chief of Naval Operations (CNO) directed, on July 31, 1980, the establishment of a DD-963 Senior Navy Steering Board (SNSB) to look into these areas of concern.

As each of the items was significant in scope, the CNO also directed that an Independent Design Review Team (IDRT) be established to evaluate each situation and to recommend corrective action. The SNSB, consisting of six flag rank officers, principally from CNO, and including several other staff members and advisors, was responsible for reviewing the progress and recommendations of the several IDRT's and for making final recommendations to the CNO for his decision.

The IDRT examined several alternatives for correcting the WHB problem. Eventually, all but six were eliminated as infeasible. Of the six that survived, only two were serious contenders for the SNSB's final recommendation. The one selected as representing the best solution was the removal of the three WHB's in each ship and the associated steam auxiliary equipment (fuel and lubricating oil heaters, laundry and galley equipment, evaporators for producing fresh water, etc.). The WHB's and the steam system were to be replaced by electric auxiliary equipment and a fourth gas turbine generator to produce the additional electric power required by the new equipment.

The remaining option represented the continuation of the waste heat recovery concept, although it was somewhat of an aberration of what now is considered by many to be the most practical answer to the Conseco problems. The IDRT considered an "improved waste heat recovery" system to be two WHB's manufactured by Combustion Engineering (CE), Incorporated, of Windsor, Connecticut. These boilers would replace the two forward WHB's, while one oil-fired boiler was to replace the aft WHB. The concept which is now considered to be a more viable approach is a one-for-one swap-out of the Conseco's for CE boilers. After some 4 months of analysis and deliberation, the IDRT proposed the all-electric configuration as the recommended course of action. The Chief of Naval Operations accepted the recommendation, and planning for the all-electric was directed.

Why the All-Electric?

Some question the objectivity of the study that resulted in the all-electric decision. There are appearances of bias almost

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from the point the IDRT study was directed. According to the IDRT's report, the initial guidance from the September 19, 1980, SNSB was to have the initial IDRT concentrate on eliminating waste heat boilers from the ship, either by eliminating the need for steam aboard ship or by installing oil-fired auxiliary boilers. However, if the first effort did not seem attractive, a second team was to investigate the improvement of the waste heat recovery system. Some would conclude this to be clear-cut "marching orders" that the WHB's had to go.

It would also seem reasonable that the Naval Sea Systems Command (NAVSEA) organization which had responsibility for the DD-963 class, the NAVSEA project manager (PMS 389), would be a participant in any deliberations which affected the class. It is significant, however, that membership on the IDRT tasked with the responsibility for determining the best corrective action to the WHB problem excluded PMS 389. The engineering professionals within the project office (PMS 389) did not believe that a waste heat recovery system was a lost cause. It was further alleged that certain personnel on the IDRT had definite antiwaste heat recovery biases. Additionally, several high-level Navy officials voiced their opposition to the all-electric, as did others in the naval community; however, their input appears to have gone unheeded.

It appears that the Navy wanted a reasonably quick solution to the WHB problems, while at the same time eliminating another problematical aspect of Navy ships, the steam auxiliary systems. Reliability, maintainability, and war-fighting ability were among the more important considerations in the guidance to the IDRT. The all-electric ship, while not a proven commodity, would undoubtedly meet the criteria to an optimal extent. Even though life cycle costs were to be considered as a part of the equation, it is highly debatable that the all-electric ship represents the best decision. In fact, some of the cost data is based upon some questionable assumptions which have been refuted by other knowledgeable people in the field.

Waste Heat Boilers Versus All-Electric Ships--A Navy Dichotomy

The all-electric ship represents a classic dichotomy within the Navy today because, on the one hand, the CNO is advocating the removal of a poor quality WHB system from one class of ship and, on the other hand, installing a much improved (ostensibly) system (and a replacement candidate) on a sister-ship class. More specifically, the CG-47 (TICONDEROGA) class cruisers are being constructed with three CE WHB boilers.

While it is understandable to some extent why the Navy would have leaned toward the elimination of WHB's because of the problems experienced in the DD-963's in the late 1970's, events in the past year indicate that the CE boiler may well be a good replacement for the Conseco boilers. The CE WHB's were supposedly designed with the elimination of the previous problems in mind. In

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addition, Combustion Engineering, Incorporated, has had long experience with naval boilers. A prototype of the CG-47 boiler is now being tested at the Naval Ship Systems Engineering Center, Philadelphia. This land-based test, a "phenomenon" which the Conseco boiler did not experience, should help to eliminate some of the inevitable "bugs." This should, in turn, lead to the installation of a reasonably effective WHB system. All factors considered, the probability of success for the CE WHB appears high. If the Navy felt this not to be the case, one might reasonably question why the Navy is installing this boiler in the CG-47 class. Conversely, if it expects a reliable and less expensive product, why not install it on the DD-963's?

A second dichotomy is also represented by the all-electric decision. It is interesting to note that the Navy's decision to go all-electric on the DD-963 class represents a totally opposite position relative to CNO policy enunciated in OPNAV Instruction 4100.5A, dated May 9, 1978, regarding management of energy resources for ships, aircraft, vehicles, and shore installations. Regarding the specific goal for naval ships, the Instruction indicates that, by 1985, a 20-percent reduction in fossil fuel energy consumption per ship underway steaming hour is desired. If the waste heat recovery system is eliminated, reaching this goal would be impossible in the DD-963 class.

The All-Electric--A Higher Cost Solution

While the all-electric ship is technically feasible and may represent an expedient solution to the DD-963 WHB problems, it does not appear cost effective. Many people were interviewed during the course of this study. A few were strong proponents of the all-electric; most recognized the problems with the Conseco WHB's and many were vocal about its shortcomings and how the problems affected them personally. However, by and large, when interviewed in depth, the vast majority believed that continuing the concept of waste heat recovery through a system such as the CE boiler was worthwhile.

Regardless of opinions, the principal question is whether the ship is able to fulfill its mission and how a given problem affects that ability. Originally, concern was centered around the poor reliability (emergent tube leaks, seal problems, etc.) experienced with the Conseco WHB's and the idea that the WHB could be the weak link in the ship's war-fighting ability.

Times are changing, however. Improvements in WHB operation are being realized. At least one ship now in overhaul has had no tube failures. Another had only three tubes plugged in 4 years. This can probably be attributed to oxygen reduction and improved chemical treatment of the WHB feedwater. It has been proven that WHB reliability can be improved if the proper attention is paid to the treatment of feedwater; therefore, improved feedwater treatment methods coupled with an improved WHB should make waste heat recovery a viable concept for the future.

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There is little argument regarding the technical feasibility and perhaps even the greater desirability of the all-electric ship. This assumes, however, that cost is no object. It is estimated that in FY 1981 dollars, the life cycle (30 years) costs for the all-electric will be well over $700 million more than if the DD-963 class is retrofitted with CE boilers. This includes some $325 million in conversion costs and $439 million in fuel costs. (Note: Costs are based upon 34 ships, which include 4 DDG-993 (KIDD) class guided-missile destroyers which were originally scheduled for the Iranian Navy and which also have Conseco boilers.) These figures should be accepted with a degree of caution. There are unknowns in both areas which could raise or lower the estimates; e.g., fuel costs, labor and material costs, experiencing greater or lesser reliability of equipment (steam and/or electric), etc. Clearly, however, the all-electric is the more expensive solution.

Present Navy Plans

Since the investigation was initiated, the Navy has altered its course to some extent. Since the SNSB recommendation and the CNO decision, there have been voices raised in opposition.

Most significantly, the Assistant Secretary of the Navy (Shipbuilding and Logistics), in a November 1981 memorandum to the Chief of Naval Material on the WHB/all-electric subject, expresses what a number of people in lesser positions have been unable to surface. He states, in part: "I recognize that this subject has received considerable high level attention to date and that the proposed alternative of either waste heat boilers or electric auxiliaries have [sic] caused controversy in the Navy technical and operating communities. Personally, I am not persuaded by the arguments in favor of the all-electric conversion * * *." He goes on to say that he tends to favor pursuing and proving the CE system and, further, recognizes the dichotomy represented by the CG-47 (WHB) and the DD-963 (all-electric) positions.

Although it appears that the Secretary's beliefs are not being accepted with much enthusiasm by some senior Navy "blue suiters," he has initiated action which counters the CNO's conversion order to some extent. He has proposed that a year's at-sea test of both the all-electric and the CE system (aboard the CG-47) be undertaken and that the results of this "sail off" be used as a basis for a decision as to what the Navy will ultimately do in regard to both the CG-47 and DD-963 class ships. In mid-February, 1982 advise was received that the Navy has suspended its plans for procurement of long lead-time items for the DD-963 all-electric conversion, pending results of the test.

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By directive dated September 28, 1981, the Committee requested an investigation into the reasons behind the Navy's decision to remove waste heat boilers (WHB'S) from its DD-963 (SPRUANCE) class destroyers. The "fuel" for the WHB's is the exhaust gases (heat) from the ship's auxiliary gas turbines which power the electrical generators. From this source of energy, the boilers produce steam which is used for distilling water, heating fuel and lubricating oil, for hotel services, etc. Because the WHB's use by-product energy (exhaust gas), this reclamation of waste energy results in essentially "free" power to produce the steam for the aforementioned uses. Removal of the WHB's would require an alternate source of power--as proposed by the Navy, a fourth gas turbine generator and electric powered (versus steam powered) auxiliary equipment.

Background

The SPRUANCE class destroyer is a new, relatively large, multimission destroyer (563 feet long, displacing 7,800 tons). Its primary mission is to operate offensively in an antisubmarine warfare (ASW) role. The entire class (originally 30 ships) was built by Ingalls Shipbuilding Division of Litton Industries in Pascagoula, Mississippi. A 31st ship, the DD-997, is nearing completion and will be commissioned in March 1983; however, it has been outfitted with an improved WHB manufactured by Combustion Engineering, Incorporated, of Windsor, Connecticut, and therefore it is not expected to experience the problems of the original 30-ship class. In addition, four similar ships originally intended for the Iranian Navy are now to become a part of the United States Navy. These ships, designated as DDG's (guided missile destroyers), are upgraded versions of the DD's, with greater capability for surface-to-air and surface-to-surface warfare. Three ships, the DDG-993, -994, and -995, have already been commissioned. The fourth, the DDG-996, will be commissioned in March 1982. The latter group has also been built with the same problematical WHB's as the DD-963 class and is also being considered for the all-electric conversion.

Scope of Investigation

Interviews were held with personnel from a number of Navy and civil sector organizations. At the higher Navy echelons, interviews were held with personnel from both the Secretariat (Shipbuilding and Logistics) and the Chief of Naval Operations (CNO) staff, principally within the Surface Warfare organization. As shipbuilding and ship modernization are Naval Sea Systems Command (NAVSEA) responsibilities, numerous interviews were conducted within that command as well as with several members of the Senior Navy Steering Board (SNSB). The SNSB was the group which ultimately

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recommended the removal of the WHB's and the modification of the class to an all-electric configuration; i.e., the addition of a fourth gas turbine generator in lieu of the WHB's.

In the field, crew members from several ships were interviewed at the Charleston and San Diego Naval Bases as well as former engineering officers now in staff positions with Atlantic and Pacific Fleet destroyer squadrons and other Pacific Fleet activities. As the Long Beach Naval Shipyard (LBNS) has been tasked by the Chief of Naval Material (CNM) with the planning and design responsibilities for the all-electric conversion, interviews were also held at that location.

Other Navy organizations have been involved in the decision process, not only regarding the WHB removal from the DD-963's, but also on the Combustion Engineering (CE) WHB being installed in the CG-47 (TICONDEROGA) class cruisers. Therefore, personnel at the Naval Ship Systems Engineering Station (NAVSSES), Philadelphia, and the Naval Ship Research and Development Center (NSRDC), Annapolis, were interviewed. NAVSSES is presently conducting extended tests on the CE WHB, while NSRDC was involved in fuel calculations for the various options considered by NAVSEA's DD-963 Independent Design Review Team (IDRT), which was established to evaluate and solve the SPRUANCE class WHB problems.

Civil sector contacts were principally with CE Marine Power Systems of Combustion Engineering, Incorporated, of Windsor, Connecticut, the manufacturers of the CG-47 WHB's, and MPR Associates of Washington, D.C., an engineering consultant firm retained by NAVSEA. MPR's employees also participated in the IDRT deliberations. In addition, General Electric Company was also contacted for an independent assessment of waste heat recovery systems.

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PROBLEMS

There is little disagreement among the persons interviewed that the DD-963 class destroyers have experienced serious problems with their WHB boiler systems. In no instance were the problems so severe as to result in a ship's being totally without electric power, thereby causing it to go "dead in the water;" however, in at least one case, two of the three WHB's on the ship were out of commission. Had a shutdown of the third boiler been necessary, the ship's electrical power would have been in jeopardy as its associated turbine and generator are to be operated only on an emergency basis due to a potential fire hazard created by "dry firing" the WHB. To fully understand the importance of the connection between WHB's and electrical power, some elaboration on the technical aspects of the system is necessary.

Waste Heat Recovery Systems

The use of waste heat is not a complicated operation. One of the most common applications of waste heat recovery is the heater system of an automobile, where the heat of the engine is dissipated by the circulation of the cooling liquid through the radiator. Heat for the passenger compartment is obtained by blowing air across a small heat exchanger (radiator or coils) which also contains the liquid from the engine's cooling system. In essence, the heat for the passenger compartment is "free" as it would normally have been dissipated to the atmosphere as a waste product of engine combustion.

Waste heat recovery is not a new concept; however, it represents a different approach to providing steam for various items of equipment. Most naval ships in the past obtained steam for auxiliary equipment from the main propulsion boilers. Others obtained steam as a by-product from the water jackets of diesel generators. A few used small boilers which, like the WHB's, made low pressure steam for the steam auxiliary equipment. In the case of WHB's on the DD-963's, the source of heat is a gas turbine (essentially a jet engine) used to drive the ship's electrical generators. The 600- to 900-degree exhaust from the turbine is then directed through the coils or tubes of the WHB (see figure 1) where the water in the tubes is heated past the boiling point to steam. The steam is then routed to the auxiliary equipment which requires steam for its operation (see figure 2).

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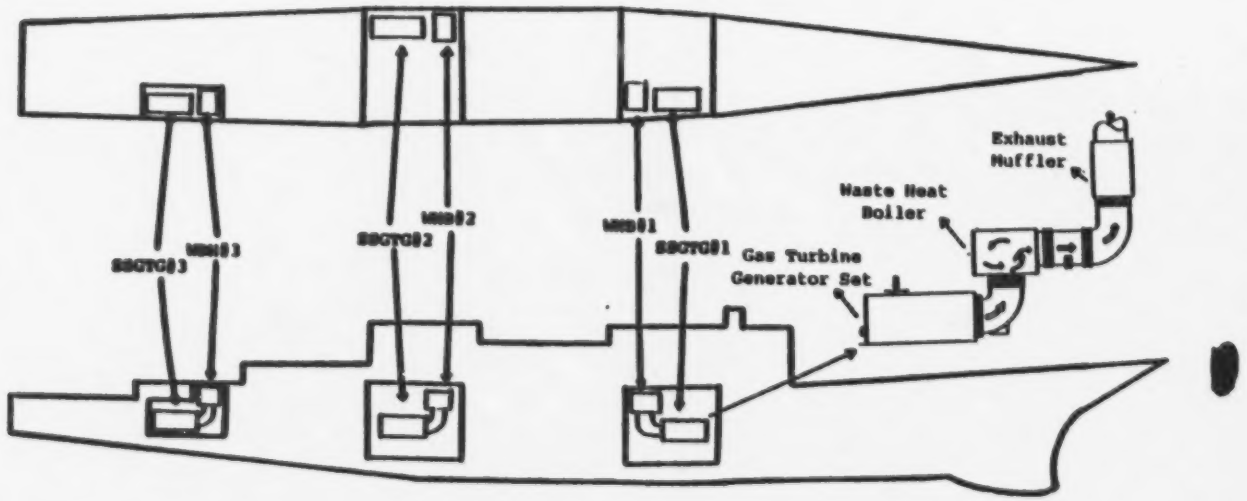
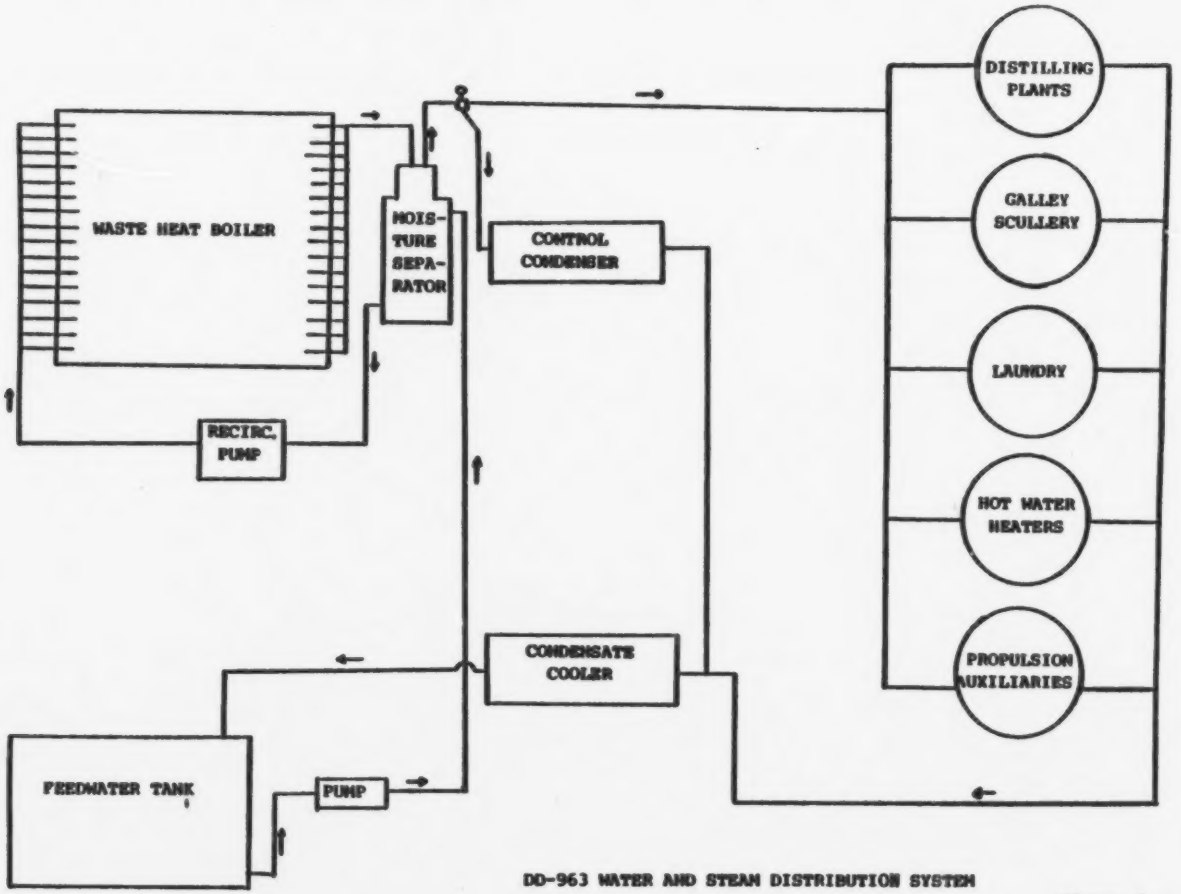


POSITIONING OF GAS TURBINE GENERATORS (SSGTG) AND WASTE HEAT BOILERS (WHB) ABOARD THE DD-963

Figure 1



DD-963 WATER AND STEAM DISTRIBUTION SYSTEM

Figure 2

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The WHB's on the SPRUANCE destroyers were manufactured by Conseco, Incorporated, of Medford, Wisconsin. The DD-963 class was procured by the Navy via a Total Package Procurement. Therefore, the selection of the WHB's was done by the shipbuilder, Ingalls Shipbuilding. The contract was ostensibly awarded on the basis of Conseco's meeting the contract specifications, the acceptability of the WHB from a technical standpoint, and price. In retrospect, because of the problems experienced with the Conseco product, one can only surmise that price was the most important consideration. Time has proven the design and engineering of the product to be almost totally unacceptable.

There is almost unanimous agreement that the Conseco WHB is unacceptable for long-term use in the DD-963's. The boilers have been a problem to the Navy since the first ship of the class, the SPRUANCE, was commissioned in 1975. Although experience has shown there is a treatment that can be applied to the feedwater which will decrease the failure rate of the boiler tubes, and, further, that the WHB system can be modified for greater ease of maintenance, the Conseco WHB is generally considered to be an ineffective operation. Conversely, with a properly engineered system, waste heat recovery can salvage and make use of energy that would literally have gone up in smoke. This can amount to an increase in energy from a given amount of fuel of from 20 to 30 percent. Considering the problems associated with fuel, particularly cost and possibly availability, the concept of waste heat recovery is not one that should be lightly discarded.

Waste Heat Boiler Problems of the SPRUANCE Class

Several major problems have been experienced with the Conseco WHB's in the DD-963 class. Over time, the Navy has attempted to correct or at least mollify some of the problems. Therefore, depending upon the age of the ship, the experience and training of the crews, etc., the frequency and seriousness of the problems have varied to some extent. Basically, however, the following problems have plagued the class as a whole:

Oxygen Corrosion

The Conseco WHB was designed with carbon-moly steel tubes many times thicker than the service temperatures and pressures would otherwise require. It was felt that the corrosion rates of these tubes would be slow enough and the tube thickness great enough that the life of the coils would approach the life of the ship. These assumptions led to a design that does not allow for identification or correction of corrosion-related failures. In service, the boiler cores have experienced extremely rapid corrosion caused by oxygen attacking the steel tubes. The same situation occurs when the boiler is idle unless certain precautions are taken. To improve the situation, the feedwater treatment process

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was changed whereby a chemical was added to the feedwater to remove dissolved oxygen present during boiler operation. In 1979, the chemical was recognized as a potential carcinogen and subsequently discontinued. A fairly complex mechanical deaerating system was then designed and is now in operation on three ships of the class. This system has shown some success, and a ship alteration to install this system on the rest of the class has been developed. As an alternative, tubes of a stainless steel material, resistant to oxygen attack, have been fabricated and are being installed on two ships of the class. The material has not been used in this type of application before, and it may be susceptible to other modes of failures. If it proves to be successful, its use could provide a more simple solution to the problem of oxygen attack. Even with the new material, however, the basic design of the tube bundles is thought by many to have inherent problems which will never be resolved.

Dry Operation

The Conseco boilers were designed to be run dry; i.e., to allow the gas turbine (and generator) to be operated even though the WHB was rendered inoperable by a tubing leak or other damage to its components or other parts of the steam system. In actual practice, dry firing of the boiler has been blamed for an engineroom fire caused by leaks in the boiler casing (exterior housing) as well as other problems. Ultimately, principally because of the frequency of casing leaks and the leakage of the turbine exhaust into the surrounding machinery spaces, concurrent operation of the generator and a dry WHB was forbidden except under emergency conditions. Because of an initially high incidence of tube failures, occasions of two WHB's (and generators) out of commission occurred with sufficient frequency to raise serious questions about the ship's capability for continued operation with such unreliable equipment inextricably linked to the operation of the absolutely essential electrical generating equipment. ("Inextricable linking" is the direct connection of the WHB by ducting from the gas turbine without any provision for routing the exhaust gas around the WHB and then out the exhaust stack. See figure 2.)

Maintainability Problems

The difficulty in maintaining the Conseco WHB and its associated equipment (feedwater pump, steam separator, etc.) has proven to be an extremely difficult problem in the fleet. Because the boiler tubes were not expected to fail, the WHB system was not designed for accessibility and ease of maintenance. It was designed in a palletized fashion which resulted in minimal use of space, but also in a virtually impossible configuration for maintenance. Therefore, in order to perform the necessary maintenance, removal of piping and other components which are not a part of the problem is frequently required. Engineering officers were almost unanimous in their complaints

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about the frequency and difficulty in maintaining the boilers, which are a severe manpower drain. Maintainability problems were manifested in several ways:

-- Since the boiler tubes were not expected to fail, no method was provided for finding and repairing leaking boiler tubes. The method employed can only indicate an area of failure covering three or four tubes. Later investigation of failed tube bundles indicated that more than half of the tubes plugged to repair leaks were plugged in error. A modification of the design to improve this situation has been installed on several ships and is scheduled for installation on the rest of the class. In addition, the tube configuration is such that a plugged tube cannot be replaced without rebuilding the entire tube bundle. This also represents a very undesirable and costly feature of the Conseco boiler. Until recently, to replace the tube bundle required cutting an 8- by 10-foot hole in the hull sufficient in size to receive the entire new bundle. Recently, however, the Charleston Naval Shipyard implemented an improved procedure whereby a smaller hull plate is cut and the tubes taken aboard one at a time instead of in the 27-tube "bundle" (there is still no provision for single-tube replacement, however). Although this has reduced the replacement problem and cost to some extent ($420,000 to $350,000 for all three bundles), an ideal WHB would allow for replacement of a single tube or tubes without any hull plate cutting or removal of miscellaneous piping and components.

-- Generally, steam systems require considerable shipboard maintenance. This is a phenomenon of all steam systems, but even more so in a low pressure steam system with generally low quality steam, i.e., high moisture and oxygen, and where a high level of new feedwater and feedwater treatment chemicals are introduced into the system. Without proper oxygen removal and chemical treatment, the large amounts of corrosives suspended in the water drastically shorten the life of the valves, pumps, and seals in the boiler system. On some ships, grit has clogged piping systems, eroded the steam separator and its internals, and clogged boiler control systems. The eroded steam separators have allowed the boiler chemicals to carry over from the boiler into the steam system. On the oldest ship of the class, the wall of one of the steam separators has eroded through, causing a major steam leak. The areas beneath the boilers, especially in the rearmost (#3) location, are virtually inaccessible. This has led to structural deterioration of boiler foundations on some ships. The compressed equipment arrangement slows the time required to repair valves, seals, and other components. An alteration to correct this problem has been approved and is programmed for installation.

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Chemical Hideout

Originally, the Conseco WHB was designed for operation without any chemical treatment of new feedwater being introduced into the system. As a result of numerous initial tube failures attributed to corrosive elements in the feedwater, chemical treatment of water in the boiler system was introduced. This has helped to reduce tube failures, but chemical "hideout" (chemicals remaining in pitted areas or areas of lesser water circulation) is still a problem as Conseco's spiral tube design is inherently unsuitable for boiler heat exchange service. Acid cleaning of the boiler tubes is hampered for the same reason, while mechanical cleaning is virtually impossible. Although proper chemical treatment shows promise for tube longevity (and is indeed a necessity for efficient WHB operation), it does not correct the inherent design shortcomings in the Navy's present DD-963 WHB problems.

Gas Side Fouling and Cleaning

The exhaust gases from the turbine passing through the WHB cause an accumulation of soot on the boiler tubes and their cooling fins. Removal of soot accumulation is necessary as it affects turbine performance and WHB steam output. The configuration of the boiler and fins makes soot blowing (steam cleaning) difficult and essentially ineffective. As a result, soot deposits accumulate and can provide the source for a fire within the boiler. In addition, soot accumulation hastens corrosion of tube sides and fins.

Ineffective Feedwater Control System

The design of the boiler feed system is inherently unstable and produces wide fluctuations in the boiler water level. This, in turn, contributes to poor quality steam. The control system is only marginally effective in regulating these fluctuations and has proven to be unreliable and difficult to maintain.

Inaccessible Location of System Components

Because the WHB system was supposed to be essentially maintenance-free, its design did not provide for ease of maintenance. One element of the system, the recirculation pump, has proven to be particularly troublesome due to leaking seals. Many instances of this problem were mentioned by the crews; however, other problems such as faulty valves were also noted. In the latter case, items such as valves were said to have been of marginal quality and/or not specifically designed for the environment in which they were used; i.e., in a low quality (moisture content), low pressure steam system.

The Ship Modification Decisionmaking Process

Due to the seriousness of the problems experienced on the DD-963, principally with the WHB systems, but also including

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some others such as the Anti-Submarine Rocket (ASROC) Weapons Handling System and the 400 Hertz Static Frequency Converters, the Chief of Naval Operations directed, on July 31, 1980, the establishment of a DD-963 Senior Navy Steering Board (SNSB) to look into these areas of concern.

As each of these items was significant in scope, the CNO also directed that an Independent Design Review Team (IDRT) be established to evaluate each situation and to recommend corrective action. The SNSB, consisting of six flag rank officers, principally from CNO, and including several other staff members and advisors, was responsible for reviewing the progress and recommendations of the several IDRT's and for making final recommendations to the CNO for his decision.

As the DD-963 is essentially a new ship, it may represent somewhat of an aberration of the normal fleet modification program (FMP) process; however, the New Construction Ship Program Review process follows the same basic path as changes generated through the FMP. Basically, the responsibility for ensuring that the platform (ship) is capable of effectively carrying out its mission is a CNO responsibility. Therefore, the platform sponsor determines what new fighting capability must be added to the ship. However, when it comes to technical improvements, the requirements may surface from one or more of several sources. In this instance, complaints had filtered through various channels from the fleet to OPNAV (abbreviation for CNO staff office) and NAVSEA. Irrespective of the source of complaints, with a new ship class the Project Manager of NAVSEA (PMS) should figure heavily in the corrective action. Normally, PMS 389, the project manager for the DD-963 class, would have been responsible for the engineering leading to reliability and maintainability improvements in the class. It is significant, however, that in this case, membership on the IDRT tasked with the responsibility for determining the best corrective action to the WHB problem excluded PMS 389. Engineering professionals within PMS 389 did not believe that a waste heat recovery system was a lost cause. It was further alleged that certain personnel on the IDRT had definite anti-waste heat recovery biases. In fact, according to the IDRT's report, the initial guidance from the September 19, 1980, SNSB was to have the initial IDRT concentrate on eliminating waste heat boilers from the ship, either by eliminating the need for steam aboard ship or by installing oil-fired auxiliary boilers. However, if the first effort did not seem attractive, a second team was to investigate the improvement of the waste heat recovery system. Some would conclude this to be clear-cut "marching orders" that the WHB's had to go. Correspondence in July 1981 from the CNO to a Congressman who also had inquired into the decision to go to the all-electric ship states, however, that the IDRT team's study "was rigorous, thorough and objective * * *." Under the circumstances, many question the latter point.

To provide support to the SNSB and to manage the team's efforts, the Commander of NAVSEA established the DD-963 Class

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Engineering Office (SEA 05X). SEA 05X currently manages the all-electric conversion program even though the IDRT, consisting of five personnel from various naval activities and three engineering consultant firm personnel, performed the actual study. The following section discusses the alternatives examined by the team.

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ALTERNATIVES EXAMINED

The Independent Design Review Team which provided the technical support to the SNSB performed the majority of its work between November 1980 and February 1981, making five presentations on its progress during that time. The Team's efforts culminated in a report in February 1982 and outlined in detail the factors considered in its deliberations, the alternatives analyzed, and its conclusions.

The various alternatives for resolving the DD-963 WHB problems were evaluated against several criteria established by CNO, specifically:

-- Maintenance/manning requirements

-- Complexity; i.e., degree of simplicity of operation and maintenance

-- Integrated Logistics System (ILS)

  - supply support, training, documentation, facilities availability

  - standardization of equipment

  - onboard supportability

-- Technical risk

-- Total ship impact; i.e., displacement margin, range, electric margin

-- Reliability/availability

-- Schedule for accomplishment of modifications to the class

-- Life Cycle Cost; i.e., development, installation, fuel, and maintenance, etc.

The major factors considered in the evaluation were reliability, maintainability and operability, electric plant margin (to accommodate future growth), technical risk, and fuel cost. The goal, as stated in the Team's report, was "to provide an auxiliary heating system that is reliable, simple to operate and maintain, and capable of supporting future growth with low risk and life cycle cost." Within these guidelines, the IDRT was to analyze alternatives, eliminating those which were clearly infeasible or impractical. There were three "generic" alternatives with various suboptions within each; specifically, an all-electric option, a steam (baseline of present Conseco boilers) option, and various steam and electric combinations. Within the three classes of options there were 11 suboptions. Eventually, all but six were eliminated because they were considered infeasible. Actually,

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one of the six was essentially maintaining the status quo with the Conseco boilers, while a second represented the Conseco with a deaerating feed tank (DFT) for oxygen removal, as well as any other feasible improvements. The latter two alternatives appear to be impractical; (1) because of the bad history of the original WHB system, and (2) due to the fact that even with improvements, the basic design of the boiler is considered to be inherently problematical. Therefore, four alternatives really survived the "cutting" process.

Ironically, one alternative, now considered to be the most viable to the present system or the all-electric ship, was discussed by the IDRT and rejected; i.e., replacing all three Conseco WHB's with CE WHB's. It was rejected, according to the report, "due to low reliability and high maintenance compared with option #4." (Option #4 is an aberration of the one-for-one replacement which retains all steam-operated equipment; replaces only numbers one and two Conseco WHB's with CE's; removes number three boiler; adds a DFT; adds generator exhaust gas bypasses around the new one and two boilers, and adds two standby 5,000 pound/hour, 100 pounds per square inch, oil-fired boilers.)

Although the Team did not have the benefit of over a year's design and test experience that now exists on the CE boiler, this may have been too quick a dismissal of a potentially viable alternative. As events have unfolded since the Team's last report to the SNSB in January 1981, the one-for-one Conseco/CE replacement alternative has gained considerable credence to the extent that many consider it to be the most viable. In fact, the situation represents a classic dichotomy within the Navy today, because, on the one hand, CNO is advocating the removal of a poor quality WHB system from one class of ship, and, on the other hand, installing a very much improved (ostensibly) system (and a replacement candidate) on a sister-ship class. More specifically, the CG-47 (TICONDEROGA) class cruisers are being constructed with three CE WHB boilers.

Alternatives Evaluated

Six alternatives were seriously evaluated by the IDRT against the "attributes" (critera) listed previously. They are:

Baseline

Continue operation of the DD-963's with the present Conseco boilers and steam auxiliaries (equipment such as heaters, laundry equipment, distillers, etc.).

Modified Baseline

Continue operation of the Conseco WHB's; however, institute a system improvement program to overcome (at least to a degree) current deficiencies. In addition, add a DFT to eliminate the oxygen corrosion problem. All steam auxiliary equipment would be retained.

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This option has been implemented to some extent to extend the life of the Conseco WHB system until some longer term solution is ultimately decided upon and implemented. NAVSEA embarked on an improvement program in December 1979 which has been updated and expanded since that time. The program has five major elements:

-- Chemical treatment
-- Addition of DFT's
-- Operational improvements to the system
-- Maintainability improvements
-- Other tasks (preparation of technical manuals for the fleet, development of system improvement package and fleet implementation plan, etc.)

The modification program is extensive. Some of the items to be accomplished would be beneficial, especially if the CE boilers were to be the ultimate resolution to the problem, e.g., installation of DFT's; however, certain others such as installation of an exhaust gas bypass to permit dry operation of the Conseco boiler (a "must") are very questionable expenditures if the CE boilers are installed, and a complete waste if the all-electric ship is the ultimate decision. Other items are questionable, depending upon the length of time the Conseco boilers remain in the ships; e.g., modification of the WHB system configuration for greater ease of maintenance.

Add Fourth Gas Turbine Generator

This option, four ship service gas turbine generators (SSGTG's), is the backbone of the all-electric ship. In it, the WHB's would be removed and all steam equipment except in the galley and laundry would be replaced with electric equipment; e.g., fuel and lubricating oil heaters, etc. In the galley and laundry, electric boilers would generate the necessary steam. To accommodate the additional electric load created by the electric equipment replacing the WHB-driven steam equipment, an additional 2,000-kilowatt (kW) gas turbine generator would be added.

Four Diesel Generators

This alternative, four ship service diesel generators (SSDG's), also results in an all-electric ship; however, in this case, the three existing gas turbine generators would be replaced by four 2,000-kW diesel generators. Otherwise, this option is essentially the same as that described in 3. above.

Three Oil-Fired Boilers

In this option, the WHB's are replaced by three oil-fired auxiliary boilers. The steam distribution system and the steam equipment would be retained. Essentially, this alternative is geared strictly to elimination of those problems associated with the WHB's as the existing steam system would remain in the ship.

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Improved Waste Heat Recovery System

Described previously in this section, but, basically, a swap-out of two Conseco boilers for two CE boilers while retaining the entire steam system.

Results of IDRT Deliberations

The conclusion of the IDRT as stated in its report was:

> "Considering all the factors, option #1B [the Team's numbering scheme], all electric with a fourth SSGTG provides the best reliability, the least maintenance, the greatest simplicity, an adequate electric plant margin, and an acceptable risk. The negative factors--ship impact, design resources needed, long production schedule, annual fuel cost, and installation cost--are not significant enough to offset the gains in performance achieved by option #1B."

Without any apparent equivocation, the IDRT chose the all-electric alternative as representing the one most closely meeting the criteria laid down by CNO. To many, however, the choice was not clear-cut. Some question the basis upon which alternatives were evaluated because certain results tended to show the all-electric alternative in a more favorable light than it deserved; e.g., using a 60-degree Fahrenheit (60°F) day to determine electrical power requirements and the resultant amount and cost of fuel. Considering the biases (mentioned in previous section) that appear to have gone into the staffing of the IDRT and the initial guidance from the SNSB, whether the study was conducted and reported in a totally objective manner is open to question.

Possible Conflict of Interest

During the course of this investigation, the question was raised as to whether one of the IDRT's engineering consultant firms, MPR Associates, may have placed itself in a compromising position. The issue was raised because two of the firm's employees participated in the IDRT effort while the company was later budgeted by the Navy for future engineering consultant services on the all-electric modification program. Conceivably, the firm could have been instrumental in recommending a decision which would later have resulted in additional follow-on work. It was also noted that MPR Associates had previously been instrumental in an SNSB decision regarding the removal of automated propulsion control systems from the LHA (amphibious assault) class--a decision which, like the DD-963 WHB removal, has been, at least, controversial.

A senior partner of MPR and the two IDRT members were interviewed to determine their position on this matter. Quite naturally,

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they did not consider their IDRT efforts and a follow-on contract to represent a conflict of interest. They pointed out several factors to justify their position:

-- The relatively small size of the follow-on contract (Navy had budgeted $160,000 for 1982).

-- The fact that the firm is not a consultant to a manufacturing firm that might profit by the all-electric decision.

-- Approximately 80 percent of the firm's business is commercial, and all business of the company is on the basis of referrals. MPR does not advertise nor does it employ marketing personnel.

-- MPR was asked by senior Navy officials to participate in both the LHA and DD-963 deliberations.

The discussion led to the conclusion that MPR does not appear to be in a position of conflicting interests. The firm has apparently had the respect of senior Navy officials for some time and has responded to various Navy requests for engineering services. One of its senior partners may be largely responsible for this rapport because of a long-term relationship with the Navy. It is believed, further, that if a firm has recognized expertise in a given area, it should be given the opportunity to obtain follow-on work where its technical expertise is recognized as being of value.

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THE ALL-ELECTRIC VERSUS ALTERNATIVES: AN ANALYSIS, COSTS, AND COMPARISONS

Because the DD-963 class in an all-electric configuration represents a marked departure from the present ship system, to fully understand the implications of the Navy's decision, an analysis of the attributes of the all-electric ship, its cost, and how it compares with other alternatives must be discussed.

As mentioned previously, the major factors governing the IDRT's recommendation were reliability and maintainability, electric load and generator considerations, fuel cost, and technical risk. In this section, these subjects are discussed and compared, where appropriate, to the other alternatives.

Reliability and Maintainability

Reliability and maintainability were of major importance to the IDRT. Reliability is paramount in a battle environment, but also a most important machinery characteristic in peacetime operations. Maintainability is likewise an important issue, especially to the engineering officers who must budget relatively limited manpower for duty in a demanding and not always pleasant environment (machinery spaces).

Reliability

The IDRT devoted much time and effort to eventually arrive at its conclusions on the reliability of the several options. Its calculations considered major components of the various auxiliary heating systems and electrical generating systems and included:

- Ship service gas turbine generators
- Ship service diesel generators
- Waste heat boiler and recirculation pump
- Oil fired boiler
- Boiler feed pumps
- Deaerating feedwater tanks
- Fuel oil transfer and service heaters
- Distilling plants
- Hot water heaters
- Electric boiler

In the final analysis, however, the figures given for the reliability of the various options on a 60°F day wartime cruise (mission) did not consider all of the above items. According to the Team's definition of reliability (reliability being the probability of the electric and steam auxiliaries meeting operational requirements without interruption for a 60-day wartime cruise mission), some of the necessary but peripheral equipment in the total system (distilling plants, hot water heater, etc.) were not included even though they perhaps should have been;

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e.g., it would be difficult to remain at sea for 60 days with an inoperative distilling plant and no fresh water. All calculations were based on a 60°F day, which, according to the Team's report, shipboard personnel and fleet staff officers felt to be the most representative temperature for fleet operations. The report indicated the following reliabilities for a 60-day wartime cruise:

-- Baseline (Conseco): .53
-- Modified baseline: .59
-- All-electric (four gas turbine generators): .84
-- All-electric (four diesel generators): .99
-- Three oil-fired boilers: .59
-- Improved waste heat recovery system: .62

A review of the Team's report gives a clear indication of the complexity of the calculations that resulted in the reliability parameters of the several options. Because of the difficulty in validating the calculations, the figures provided were accepted as correct, considering the assumptions upon which the calculations were based.

It is interesting to note several points, however. First, according to the above figures, the all-electric ship with four diesel generators has the highest reliability. This alternative, which some believe may have the lowest life cycle cost, was rejected by the IDRT because it was believed that the ability to quiet mount the diesel generators had not progressed to the point where it could be considered an acceptable risk. Therefore, to preclude any degradation in the detectability of this ASW ship because of increased noise, the alternative was rejected. Second, while the reliability of the improved waste heat recovery system is constant (.62) regardless of temperature, the reliability of the gas turbine all-electric ship is not always .84. On a 10-degree day, reliability drops to .43 because three generators are required to be on-line.

The essence of the reliability issue, is that the figures postulated for each alternative are open to question. It is true that in most temperatures approaching 10 degrees, the reliability of the all-electric will not change from the .84 figure. A detractor of the all-electric would not hesitate to highlight the 10-degree figure and the criticality of certain other parts in the system, such as the vapor compression (electrically driven) distiller, which is relatively unproven in fleet service. Conversely, the proponents of the all-electric are not hesitant to point up, without further explanation, the .84 to .62 ratio (reliability) between the four SSGTG all-electric ship and the ship with improved WHB's. Therefore, it does not seem unreasonable to conclude that both alternatives would, in reality, be more than capable of completing the 60-day mission except under the most extreme set of adverse circumstances.

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Maintainability

Due to the original design concept which downgraded potential system failures and concentrated more on saving space, the maintainability of the Conseco boilers is extremely poor. Therefore, when failures have occurred in the tube bundles, pumps, or other components, maintenance and repair have been an overly time-consuming and odious task. In many cases, components which are not a part of the problem must be removed in order to repair the item at fault. At best, maintenance of the Conseco boilers is an unpleasant task for those who must work in the extremely cramped quarters.

The IDRT addressed the issue of maintainability in three respects: onboard supportability, simplicity of operation, and maintenance manning requirements. In onboard supportability, the Team rated the four SSDG all-electric option highest, with the four SSGTG second. Of the six options, the improved waste heat recovery system was rated fourth. For simplicity of operation and maintenance, the all-electric options rated first (SSGTG) and second (SSDG), with improved waste heat recovery rated third. In the area of manning, in spite of the admitted difficulty of maintaining the Conseco WHB's, the difference between the baseline (Conseco) and any other alternative is, at most, one additional person per ship.

While shipboard maintainability was considered a major requirement in any "fix," from a cost standpoint, maintenance at overhaul intervals was also calculated for the six alternatives. For the baseline, the two principal contenders, and the diesel generator option (for comparison purposes), the following are the estimated annualized costs:

-- Baseline (Conseco)	$627,000
-- Four SSGTG's	320,000
-- Four SSDG's	356,000
-- Improved waste heat system	509,000

Although the maintenance costs for the four SSGTG system can be fairly accurately estimated because three are presently installed in each ship, there are other questions. First, experience has not been gained on the electrical auxiliaries that would replace steam auxiliaries. In addition, the improved WHB system as postulated in the report has only two CE WHB's and two oil-fired boilers, not three CE boilers as would be more desirable. There is no experience factor on the maintenance/ overhaul requirements of the CE boiler; therefore, estimates are based, at least in part, on experience with the Conseco's.

As a result of interviews with knowledgeable sources concerning the maintainability of the CE WHB, the Investigative Staff questioned what appeared to be a very high annualized cost ($509,000) for the improved waste heat recovery system as estimated by the IDRT.

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Therefore, NAVSEA was asked to make an independent assessment of what might be expected to be the annualized cost for maintenance of three CE WHB's, including the existing steam auxiliaries and steam distribution system. Although this does not exactly parallel the IDRT's improved waste heat recovery system of two CE boilers and one oil-fired boiler, which were the basis for the $509,000 estimate, it was considered close enough to provide a realistic com parison. The result of the second assessment of annualized maintenance cost was striking as it is almost $150,000 less than the IDRT estimate; i.e, $362,00J. Obviously, if this assessment has any degree of validity, it puts the Conseco to CE swap-out well within the range of acceptability/comparability when compared to the SSGTG all-electric; i.e., $362,000 versus $320,000.

This is an important factor to be considered as it mitigates very strongly against the argument that the SSGTG all-electric ship is much less expensive to overhaul than the ship with an improved waste heat recovery system.

Cost of Conversion

All-Electric

The cost of converting the DD-963 class from WHB's to all-electric is one of two major cost factors.

The estimated cost for the conversion of the lead ship, the USS FOSTER, to all-electric has been placed at $22.0 million. Since this ship is the prototype, certain nonrecurring costs, both at Long Beach Naval Shipyard (design agent and lead shipyard for developing the conversion package) and Litton Industries (design agent for the guidance and control system), appear in the estimate. Also included is $2.7 million for developing a vapor compression distiller for potable water. The following breakdown is the estimated cost of converting the lead ship, the amount obligated through January 22, 1982, and the cost for each additional ship in the class.

(1981 dollars—in millions)

	Lead Ship	(Appro-priation)	Obligated through 1/22/82	Each Additional Ship
Basic alteration design (LBNS and NAVSEA)	$ 3.8	(OMN)	$2.9	$ -
Design of Guidance and Control System (Litton Industries)	1.9	(OMN)	1.9	-
Material (LBNS and NAVSEA)	4.7	(R&D)	2.1	6.0 [1]
Labor (LBNS)	8.9	(R&D)	-	6.6 [2]
Distiller Development	2.7	(R&D)	.7	-
Total	$22.0		$7.6	$12.6

1 Mostly OPN funds;
2 Mostly OMN funds

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As noted, the $12.6 million figure for each additional ship is in 1981 dollars; however, in "then year" dollars, the cost of converting the remaining 33 ships (29 DD-963 class ships plus the 4 ships in the DDG-993 (USS KIDD) class) is $634 million. The entire program would be completed by 1992.

Three Conseco WHB's to Three CE WHB's

The cost of converting the class from Conseco WHB's to CE WHB's is considerably less than for the all-electric. Because the alternative of converting from the Conseco boilers to the improved waste heat recovery system (two CE boilers and one oil-fired boiler) is not considered at this time as representing the best version of an improved waste heat system, only the one-for-one replacement was costed. The following are the rough order of magnitude (ROM) costs for the CE retrofit:*

	1982 dollars (in thousands)
Labor	$ 654.4
Material	2,063.7
Miscellaneous (G&A, etc.)	523.9
Total (second and later ships)	$3,242.0
Total** (lead ship)	$3,318.2

* The estimate assumes the retrofit project would occur during regularly scheduled availabilities (repair cycles). Otherwise, another $850,000 would be required for additional level of effort support costs and dry docking.

** $76,000 in engineering labor and overtime included in the estimate for the lead ship would probably not apply to follow-on ships.

The Navy pointed out that the figure it would use for planning purposes is approximately $3.318 million. Navy officials indicated further that ROM estimates are considered to be accurate to within 30 percent plus or minus, so the estimate must be tempered with that factor in mind. For comparison purposes, therefore, the figures of $12.6 million for the all-electric conversion and $3.318 million for the Conseco to CE swap-out are probably reasonable. The Navy believes converting to all-electric will increase the ships' reliability and availability and that they will be easier to maintain. It may be questioned whether a marginal increase in these characteristics is affordable, especially when the SPRUANCE class mission has not suffered measurably because of the present waste heat system, and, a better waste heat boiler is believed to exist at one-third the cost of the all-electric conversion.

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Continuation of Conseco WHB's

At this time, without a firm decision as to the ultimate course of action (see Section V, THE NEXT STEP), the Navy is endeavoring to live with the Conseco boilers. To extend the life of the Conseco system, several actions have been taken. To reduce oxygen corrosion, DFT's have been installed on the DD-990, -991, and -992. The USS KIDD class, DDG's -993, -994, -995, -996, is also being fitted with DFT kits. (This class is essentially a derivative of the SPRUANCE class and also has Conseco boilers installed.) One of the class, the DDG-994 (USS CALLAGHAN), is being used as a test platform for certain Conseco fixes, e.g., exhaust gas bypass ($956,000 per ship), DFT's, and installation of tube bundles of a different alloy material. In addition, a ship alteration for the DD-963's is in the early stages of retrofit on the DD-965 and subsequent ships beginning in 1982--a modification to make the WHB configuration more accessible for maintenance. No estimate of the total cost of the various WHB-related modifications to the class was provided; however, considering the number of items involved, the cost will not be cheap, especially considering the cost of the exhaust gas bypass, which has been proposed at about $1.0 million per ship.

There is one "set" of costs that is quantifiable, however--the cost of replacement of three sets of tube bundles, which, as mentioned earlier, will run in the $400,000 range per overhaul cycle. This assumes the bundles will last the 5 years between regular overhauls (ROH's). The longer life may be attributed to the reduction of oxygen in the feedwater and improved chemical treatment of the feedwater. The replacement of tube bundles alone, over a 30-year life cycle, would amount to some $60 million (1981 dollars).

Certain corrective actions are not wasted effort, e.g., addition of DFT's, improved chemical feedwater treatment, etc.; however, it is believed that the life improvement program for the DD-963 class may be a waste of money in some respects. Although improvements are admittedly needed, it may be much more realistic to replace the Conseco's with CE boilers at the earliest possible scheduled overhaul date in lieu of any Conseco tube bundle replacements or modifications. If even the exhaust gas bypass modification can be eliminated from the class (due to the advertised ability of the CE to run dry), some $30 million will be saved. That alone represents approximately 10 ships' "worth" of improved waste heat recovery systems and, possibly, the best accommodated long-term solution.

Fuel Cost and Energy Impact

A major factor when considering the removal of the waste heat recovery system from the DD-963 class ships is the additional amount of ship service fuel (fuel used to power the SSGTG's) an all-electric ship would require. Since waste heat is currently being used to produce steam for auxiliary equipment and essential

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services, removal of this system would require additional electrical power to supply these needs. This would, in turn, require higher generating loads, thereby increasing annual fuel consumption.

Fuel consumption is the biggest single life-cycle item which increases the cost of the all-electric ship. Over time, the estimated increased annual cost for each ship's ship service fuel varied from slightly over $2.0 million down to the current estimate of less than $350,000. Due to the wide disparity in the estimates, considerable effort was made to resolve the issue so that realistic annual increased fuel costs could be determined.

Early Estimates

The $2.0 million figure was found to be an initial calculation by the IDRT based on estimated 1983 fuel costs and some overly pessimistic assumptions. This figure was never actually presented by the IDRT to the SNSB. Actually, it was considered invalid at an early point and never considered as an "official" estimate. The $2.0 million figure did manage to find its way outside the confines of the Team's deliberations, however, and has been mentioned as one of the principal detracting factors against the all-electric ship. In reality, in the draft IDRT report, additional annual fuel costs were estimated to be $970,000 per ship calculated assuming a 60°F day(s) using three generators one-half of the time while under way. Recently, however, SEA 05X has recalculated this figure and has arrived at the aforementioned $350,000 per year per ship additional fuel cost for the all-electric. The downward revision (explained below) is attributed to action to correct a problem with high turbine inlet temperature under heavy load conditions.

Why the Decrease in Fuel Cost Estimate

The DD-963 class, with its present equipment, has a deficiency in the ability of the electric plant to recover from a turbine/generator failure. The desired method is to operate with two generators running in parallel with the third on a standby basis. If one generator is lost for any reason, the remaining operating generator continues to run while the electrical distribution system automatically sheds nonvital loads down to the point where the second generator can carry the total remaining load. Subsequently, the standby (third) generator is started and brought on line. In actual practice, the gas turbine response is such that the remaining (parallel) operating generator does not continue running under some conditions and trips off line before load shedding takes effect. The result is a complete loss of electrical power. The basic problem is that the turbine trips off due to the higher turbine inlet temperature caused by the increased fuel required for the additional load. By June 1981, a fix was developed that prevented the turbine outage and allowed for continued operation. The corrective action is a combination of power distribution system changes and turbine

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control changes that allow the turbine to keep running while increasing the electrical load. The fix has proved to be successful and will be installed on all ships of the class.

Effect on Fuel Calculations

Before the fix was tested, fuel consumption for electric auxiliaries was based on operating three turbines 50 percent of the time to ensure that the ship would not lose all power in the event of a generator outage. However, running three turbines consumes considerably more fuel than running two. Further, at low load levels the turbines operate at lower efficiency.

After correcting the problem, fuel consumption was calculated using only two turbines because only two are required to carry the load without incurring a further turbine casualty created by the sudden increase in electrical load.

Present Fuel Usage and Cost (With WHB's)

The current ship's service annual fuel consumption for each DD-963 is 46,830 barrels (bbls). Calculations were performed assuming the ship operates 4,032 hours/year (168 days) at sea with an average electrical load of 1,728 kW shared between two generators, and 1,752 hours/year (73 days) at anchor with one generator supplying a load of 1,291 kW. These figures were estimated from a 24-hour average load on a 60°F day. On a daily basis, the ship consumes an average of 224 bbls of ship service fuel under way and 126 bbls at anchor.

Based on an FY 1981 delivered fuel cost of $94.23 per barrel, the current DD-963 annual ship service fuel cost is approximately $4.4 million per ship.

All-Electric Fuel Usage and Cost

The increase in electrical load resulting from the conversion to all-electric auxiliaries is 380 kW (60°F cruise day) under way and 213 kW at anchor. Using the same criteria for operating hours as the current DD-963, the annual fuel consumption for the all-electric ship would increase by 3,681 barrels at a cost of $346,860. This figure is believed to be conservative. As stated previously, the annual fuel consumption was calculated with the ship operating in 60°F weather. As ships operate in colder or warmer climates, the power requirements increase, which also increases the amount of fuel consumed. Another reason this figure is considered conservative is the fact it was based on FY 1981 fuel prices. Future fuel prices are hard to predict; however, it can be assumed they will be higher by 1983, when the all-electric prototype is scheduled for completion.

All factors considered, the annual fuel increase amount per all-electric ship would probably be in the $.35 to $.5 million

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range; however, it is possible that it could go higher, particularly for those ships operating in colder climates for any extended period; e.g., the North Atlantic and North Pacific areas, including the areas around northern Japan and Korea. Conversely, although not as demanding, the power requirements in warmer climates are greater than the 60°F day upon which the calculations were based. This would include, at least, the Indian Ocean area. Also, conceivably, the ships may choose to operate under way with three generators running at times when high electrical loads are being experienced. This would negate the benefits of the high gas turbine inlet temperature fix (assuming it proves reliable in fleet service) and would result in a much higher fuel usage (and cost) rate. Conservatively, all factors considered, there may well be a $10-15 million annual increase in fuel cost realized by the all-electric DD-963 over the same ship with a waste heat recovery system. For the 30-ship class over a 30-year life cycle, this represents between $300 and $450 million (1981 dollars).

It is interesting to note that the Navy's decision to go all-electric on the DD-963 class represents a totally opposite position relative to CNO policy enunciated in OPNAV Instruction 4100.5A, dated May 9, 1978, regarding management of energy resources for ships, aircraft, vehicles, and shore installations. Several extracts from the instruction indicate, generally, the Navy's goals regarding energy use:

-- * * * * future energy savings must be obtained through improvements in energy conversion efficiencies, use of energy efficient procedures and reduction of energy waste."

-- Regarding the specific goal for naval ships, "20 percent reduction in fossil fuel energy consumption per ship underway steaming hour."

-- "Maximize availability of shore power and steam for utilization of ships in port." The instruction further states, regarding policy: "Every effort shall be made to achieve the objectives and goals of this instruction without compromise to military readiness, safety, and effectiveness. Waivers from this requirement due to operational commitments should be sought directly from the Chief of Naval Operations via the appropriate administrative chain of command."

Obviously, the all-electric ship will not meet the Navy's goal of a 20-percent reduction in fuel consumption by 1985 (the period allowed to achieve this reduction). In fact, the proposed solution and the resultant increased fuel usage are totally counter to the CNO's direction. Thus replacement of the Conseco WHB's with an operationally sound WHB will in no way "compromise military readiness, safety and effectiveness." Although the

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all-electric ship would likely be a more easily maintained "plant," some accommodations must be made if the Navy is serious about its stated goal of fuel reduction. The all-electric conversion of the DD-963's does not represent this accommodation.

Projected Electric Loads

The IDRT cited, as one of the major considerations in selecting the all-electric option, the ships' future electrical requirements for which an additional generator must provide. The present DD-963 has a generating capacity of 3,600 kW, with three 2,000-kW generators on board (the 3,600 kW is calculated by assuming one generator is inoperative due to maintenance or casualty; design capacity is then 90 percent of the rated capacity of the remaining generators).

Basically, electrical loads are calculated considering battle or cruising conditions and ambient temperature. For example, the DD-963 now draws down 2,264 kW on a 90°F cruise day; however, this figure increases to 3,055 kW under cruise conditions on a 10°F day. Battle load requirements are generally lower since nonvital loads would be shut off under these conditions.

Using the baseline generating capacity of 3,600 kW and subtracting the higher requirement of 3,055 kW (10°F cruise), the current DD-963 has a future growth capacity of 545 kW. The information below, provided by NAVSEA, shows future electrical load requirements for a DD-963 class combat systems upgrade. An official at NAVSEA stated that these requirements should not change through 1990.

Item	Cruise Load (kW)		Battle Load (kW)	
	10°F	90°F	10°F	90°F
CIWS	43	43	84	84
SEAFIRE	8	8	14	14
Vertical Launch System (TOMAHAWK)	224	24	232	32
LAMPS III	2	2	4	4
OUTBOARD - Phase II	3	3	6	6
AN/SQR-19 TACTAS	13	13	5	5
AN/SQS-53 Improved	3	3	5	5
Communications Upgrade	2	2	2	2
Miscellaneous Electronics	3	3	4	4
Emerging Electronics Upgrades	6	6	10	10
Combat System - 400-hertz Supply	76	76	114	114
Total	383	183	480	280

As can be seen above, the combat system's upgrade during 10°F battle conditions will require an additional 480 kW, well within

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the growth margin of 545 kW; therefore, it appears at this time that the three 2,000-kW generator configuration will be adequate at least into the 1990's.

Adding the fourth generator will give the all-electric ship a design generating capacity of 5,400 kW (see chart following). The all-electric auxiliaries will require an additional 643 kW while cruising on a 90°F day and 1,030 kW while cruising on a 10°F day. Battle load requirements for the auxiliaries are much lower (275 and 625 kW, respectively). This will give the all-electric ship an electrical growth capacity of 1,315 kW, calculated by taking the 3,055-kW baseline ship load requirement on a 10°F cruise day, adding the 1,030 kW for electrical auxiliaries (10°F cruise day), and subtracting this figure (4,085 kW) from the generating capacity (5,400 kW) of the all-electric ship. As can be seen from the above figures, the all-electric ship will provide an abundance of generating power that should last through the life of the class. However, knowledgeable sources at Ingalls (the shipbuilder) and NAVSEA have stated the current 2,000-kW generators can be upgraded to 2,500 kW. This would give the baseline DD-963 an electrical growth margin of 1,445 kW (10°F cruise day). The following chart (figure 3) is a summary of the DD-963 class electrical load requirements and generating capacity.

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DD-963 CLASS ELECTRICAL LOAD SUMMARY
(Kilowatts)(kW)

	Design Generating Capacity	Cruise Load 10°F Day	Growth Margin 1/	Battle Load 10°F Day	Cruise Load 90°F Day	Battle Load 90°F Day
Baseline DD-963 (three 2,000-kW generators)	3,600	3,055	545	2,742	2,264	2,334
All-electric conversion (four 2,000-kW generators)	5,400	4,085	1,315	3,367	2,907	2,609
Additional kW required for electric auxiliaries (all-electric minus baseline)	xxxxx	1,030	xxxxx	625	643	275
Upgrade baseline DD-963 (three 2,500-kW generators)	4,500	3,055	1,445	All loads same as baseline.		

1/ Growth margin shown for cruise 10°F day since this condition requires the highest generating loads.

Figure 3.

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Given the expected future electrical load requirements of the DD-963, the baseline ship is more than capable as currently configured with the three 2,000-kW generators. Should electrical load requirements expand beyond that currently contemplated, it is believed technically feasible for the 2,000-kW generators to be upgraded to 2,500 kW. The upgrade is estimated to cost somewhat over $4.0 million as compared to a fourth generator's cost of $6.2 million (complete and installed, but without electric auxiliaries as in the all-electric conversion). Adding a fourth generator to meet unknown or historical growth requirements does not appear warranted, especially since upgrading the current generators to 2,500 kW is considered technically possible.

Technical Risk

The last major factor that the alternatives were evaluated against was technical risk. Both the all-electric (SSGTG) and the improved waste heat recovery options were considered to represent moderate technical risk.

In the case of the four SSGTG all-electric ship, there were three factors involved:

(1) Those risks associated with the development of the electric distiller.

(2) The need for suppression of an increased infrared (IR) signature caused by the additional heat of a fourth gas turbine generator. In addition, and of greater consequence, is the fact that with no waste heat boilers acting as heat exchangers cooling the exhaust gases, some other means of reducing the temperature of the additional heat must be found.

(3) Potential problems in the arrangement of topside combat systems. It was originally believed that a new exhaust stack would need to be built where an antenna and a missile launcher had been planned. This has since been resolved in that the fourth turbine's exhaust gases will be routed to an existing stack.

An improved waste heat recovery system as postulated by the IDRT also represents certain risks, principally as regards the unproved CE WHB. The improved waste heat recovery system represented a system with two WHB's and one oil-fired boiler. In addition, the concept also provided that the WHB's could be separated from the gas turbines (to allow the generators to be operated independently) by an exhaust gas bypass. Both of the latter items were also considered to represent a degree of risk. The bypass is undoubtedly a low-risk item as it is merely a mechanical means of preventing the turbine exhaust from flowing through the WHB, and it has been designed and is being installed in the DDG-994 which also has Conseco boilers. Likewise, technical

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risk should be negligible for oil-fired boilers which have been in service in the Navy for many years.

In actuality, however, events seem to have overtaken the two CE boiler/one oil-fired boiler alternative. Three CE boilers are now generally discussed as being the more viable waste heat alternative. With this alternative, there is, without doubt, some degree of risk. Although the CE boiler was designed to overcome the problems of the Conseco boilers including, especially, the ability to operate the generator with an inoperable WHB, it has not been proven through operational service. (It is now undergoing landbased testing at NAVSSES, Philadelphia.) How long it will last in actual naval service is a matter of conjecture at this point.

Shore Power

During the course of the study, it was mentioned that conversion to electric auxiliaries would increase electrical loads and further strain shore facilities which are already marginal in many areas. The cost of upgrading shore facilities at the Charleston, Norfolk, and San Diego Naval Bases to handle the additional loads of an all-electric ship has been placed at $31 million (FY 1985 and beyond then-year dollars). Information was provided, however, that shore facilities at these locations are scheduled for future upgrading and that the all-electric ship is only accelerating the program.

At one naval base, it was noted that current practice is to run one ship generator 50 percent of the time while in port because of the base's inability to supply quality power. The Investigative Staff later observed all the DD-963 class destroyers using ship-generated power, while shore facilities were not connected. Ship operators stated that this was not an anomaly, but that shore power cables are difficult to handle because of their weight and other factors, and that it is much more convenient to light off a generator for hotel services. In addition, the problem is compounded when ships are nested (side by side) and cables have to be draped across ships closer to pier facilities.

The question of shore power appears to be a secondary issue as a decision factor on the all-electric ship. While it is true that some berthing facilities are lacking the power that would be required if testing of weapon systems, radars, etc., were being conducted at maximum levels for each ship at a given pier, it is doubtful that the ships (especially those nested outboard of the pier-side ship) would choose to connect up to shore power, short of an edict that it be done. Information recently received indicates, however, that at least one naval base requires the use of shore power if the ship is to be in port more than 2 to 3 days.)

There is an important point to be made regarding shore power. In some cases, steam at the pier is a by-product of electric power generation and, again, essentially "free." The all-electric

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ship with its electric auxiliaries would be unable to use this free pier-side source of energy. Therefore, the in-port cost of electric power would necessarily be higher due to increased loads brought about by the need to operate electric auxiliary equipment instead of steam auxiliary equipment.

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THE NEXT STEP

Improvements Are Occurring

While the all-electric ship is technically feasible and may represent an expedient solution to the DD-963 WHB problems, based on available information it does not appear cost-effective. Many people were interviewed during the course of this study--from personnel in the Navy Secretariat to a shipboard "oil king" (sailor responsible for chemical analysis and treatment of feedwater). A few were strong proponents of the all-electric; most recognized the problems with the Conseco WHB's and many were vocal about its shortcomings and how the problems affected them personally. However, by and large, when interviewed in depth, the vast majority believed that continuing the concept of waste heat recovery through a system such as the CE boiler was worthwhile. Although not discounting the problems associated with steam systems, especially low pressure steam systems, most believed that improvements were possible and that they could accommodate to an improved system.

Regardless of opinions, the principal question is whether the ship is able to fulfill its mission and how a given problem affects that ability. Originally, concern was centered around the poor reliability (emergent tube leaks, seal problems, etc.) experienced with the Conseco WHB's and the idea that the WHB could be the weak link in the ship's war-fighting ability. The concern was based upon the fear that with the poor reliability of the Conseco WBH's, and the time-consuming difficulty of repairing them, it was possible that two WHB's could be in an outage condition. Because the boilers and the generators are "coupled" and the operation of the generators was problematical (actually, a fire hazard) with an inoperative WHB, Navy officials feared a situation where two boilers would be down. Two occasions of this were mentioned, and both necessitated a return-to-port decision. Failure of the third WHB could have meant going "dead in the water" or operating under very marginal power and safety conditions. Therefore, the SNSB made the decision to eliminate all possibility of generator failure by going to the all-electric ship.

Times are changing, however. Improvements in WHB operation are being realized. At least one ship now in overhaul has had no tube failures. Another had only three tubes plugged in 4 years. This can probably be attributed to oxygen removal and improved chemical treatment of the WHB feedwater. On the few ships where this has occurred, credit for the improvement is due, in part, to the attention of the ship's officers and crew to what is finally becoming recognized--WHB's, like main propulsion boilers on steam-powered ships, require proper "care and feeding." However, in spite of some significant improvements, the Propulsion Evaluation Board (PEB) for the Pacific Fleet found that, for the most part, the ships' boiler water/feedwater programs were ineffective.

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Of 17 evaluations in 1981, 11 were rated ineffective, indicating clearly that some ships are paying insufficient attention to the program to improve feedwater treatment. Therefore, even though the situation is improving to some extent, there needs to be greater emphasis in this area to realize the potential of waste heat recovery systems. It has been proven that WHB reliability can be improved if the proper attention is paid to the treatment of feedwater. To disregard proper WHB operation and maintenance and then to write off waste heat recovery and its cost-effectiveness by going all-electric is akin to "throwing out the baby with the bath water."

In spite of the fact that boiler treatment techniques are still lacking in certain respects, the potential exists for improvement in waste heat boiler operations. Improved treatment methods, coupled with an improved WHB, should make waste heat recovery a viable concept in the future.

The Issue of Cost

There is little argument regarding the technical feasibility and perhaps even the greater desirability of the all-electric ship. This assumes, however, that cost is no object. A summary of several major cost factors is necessary.

Cost of Conversion (34 ships)

All-electric	$437.8 million
Conseco to CE WHB	112.2 million
Difference	$325.6 million

Additional Fuel (30-year life cycle)

All-electric; 34 ships, approximately $14.6 million/year	$438.8 million
CE WHB	0.0 million
Difference	$438.8 million

Overhaul (30-year life cycle)

All-electric	$326.4 million
CE WHB	369.2 million
Difference	$(42.8)million

From the above, it may be concluded that estimated life cycle costs are approximately $721.6 million more for the all-electric than if the ships were converted from Conseco to CE WHB's. As the

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estimates are in 1981 dollars, the "then year" costs will be higher. Caution is required in the use of these figures, however. There are unknowns in both areas which could raise or lower the estimates; e.g., fuel costs, labor and material costs, experiencing greater or lesser reliability of equipment (steam and/or electric), etc. Clearly, however, the all-electric is the more expensive solution.

Present Navy Plans

Since the investigation was initiated, the Navy has altered its course to some extent. Since the SNSB recommendation and the CNO decision to remove the WHB's and convert the class to all-electric, there have been voices raised in opposition to the decision. Even prior to the final decision by CNO, some senior Navy officials were reluctant to abandon the waste heat recovery concept in favor of an obviously more expensive solution.

It remained for the present Assistant Secretary of the Navy (Shipbuilding and Logistics) to officially counter the CNO position. In a November 9, 1981, memorandum to the Chief of Naval Material, he expresses what a number of people in lesser positions have been unable to surface. He states, in part:

> "I recognize that this subject has received considerable high level attention to date and that the proposed alternative of either waste heat boilers or electric auxiliaries have [sic] caused controversy in the Navy technical and operating communities. Personally, I am not persuaded by the arguments in favor of the all-electric conversion; rather I tend to feel that we should be committed to proving the present system being installed on DD997.[1] Nonetheless, it is clear that most arguments offered to date were on behalf of an all-electric alternative concept and many are based on engineering judgment rather than being well-founded in fact. We simply do not have good reliable data on which to evaluate judiciously the system performance of either alternative. Both alternatives require engineering development of components which have not been tested as yet."

[1]The DD-997 "present system" is a CE boiler configuration.

In a later memo to the CNM dated January 13, 1982, the Assistant Secretary points out the Navy's dichotomous positions reflected by (1) the Navy's proposed removal of the WHB's from the DD-963 class and (2) the installation of CE WHB's on the CG-47 class. He also outlines what he believes the Navy's course of action should be to resolve both issues, stating:

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"Because waste heat boilers and steam auxiliaries remain among the principal engineering design features in one of the Navy's largest surface ship building programs (CG-47), and because our experience with the DD-963 Class waste heat recovery systems casts doubt on the viability of that feature, I consider it imperative that we get a ship to sea as early as possible with the CG-47 (Combustion Engineering) waste heat boiler and related systems. It is only through closely monitored operational experience with these units that we will be able to decide whether the Combustion Engineering boiler and associated auxiliaries will stand up to the ship's operational requirements, or whether an alternative approach is required. If the CG-47 waste heat boiler and auxiliary systems achieve design specifications in an operational environment, a similar system may offer the best solution to the DD-963 waste heat boiler problems, at lower installation and operating costs than the all-electric alternative being prototyped on USS PAUL FOSTER (DD-964). Conversely, if the Combustion Engineering boiler provides unacceptable performance operationally, then we must consider timely changes in the CG-47 auxiliary system design to reduce costs and minimize delays in follow ships of that class."

It appears that the Assistant Secretary's position on this matter is, at best, reluctantly accepted by senior naval officers. In response to the Assistant Secretary's November 9, 1981, letter, the CNM states:

* * * * the modifications to the existing CONSECO boiler system are an interim stop-gap measure. The alternatives are, therefore, converting to the all-electric system, or to the CG 47 Combustion Engineering Boiler System. The program now provides for a full year of at-sea evaluation of the electric auxiliaries, from completion of the prototype installation in USS PAUL F. FOSTER in July 1983 to July 1984. <u>The results of this evaluation will be compared carefully with the CE boiler experience in both CG 47 and DD 997, which are scheduled to deliver in January 1983 and February 1983 respectively, prior to commencing installation of follow-ship electric conversions in the DD 963 Class</u>. (underlining added)

"3. I am personally convinced that the conversion to all-electric auxiliaries provides the surest and most practical long-term solution to the waste heat boiler and steam auxiliary system maintenance and reliability problems now being experienced in the DD 963s. It will additionally provide the increased

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electric plant reliability and capacity required for future combat systems growth. However, if the at-sea evaluation of the all-electric system versus the CG 47 CE boiler system proves our current engineering judgement wrong, the program can be modified accordingly. In the meantime, I recommend we continue with the approved alternative to plan and budget for conversion of the class to electric auxiliaries within the shortest practicable time frame. There is $1.1M in FY-82 for long lead items." (underlining added)

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Report of September 23, 1981

U.S. ROLAND AIR DEFENSE MISSILE SYSTEM

The Army plans to spend almost $4 billion ($533 million in FY 1982) to procure and operate the ROLAND air defense missile system even though Army approved studies show that suitable alternatives are available which provide equal or better defense at much less cost. In essence, ROLAND is not the most cost-effective system available for its limited mission. Because of the cost, original plans to replace the CHAPARRAL system with ROLAND have changed. Current plans are to field ROLAND to provide short-range air defense for a few selected rear area assets in the European theater.

ROLAND is Not a Cost-Effective System

Three recently approved Army studies show that for all missions where ROLAND could be considered as a candidate, alternative systems are available which provide equal or better defense at significantly less cost. It is not a cost-effective system for providing point defense of critical assets in the rear area; the Army has decided to retain CHAPARRAL as the division short range air defense (SHORAD) missile system; and the HAWK missile system has been selected to complement the PATRIOT missile. Moreover, the ROLAND system currently in production will not meet the projected 1988 threat without significant improvements in its capabilitites. These improvements, which were not evaluated in the studies, may result in as much as $125 million in research and development costs alone.

Prior to starting production of ROLAND, the Army conducted a study to determine which system should be fielded for low-altitude protection of key installations in the theater rear areas. Primary factors considered in the study were cost and effectiveness. The study concluded that derivatives of HAWK and CHAPARRAL were more cost effective than ROLAND. Additionally, CHAPARRAL is more survivable than ROLAND.

The cost analysis showed that ROLAND was the most expensive of the alternatives considered. CHAPARRAL with Forward Looking Infrared (FLIR) and Passive Optical Seeker Technique (POST) was the least expensive. The following table shows a comparison of CHAPARRAL, HAWK, and ROLAND costs.

	Costs for Rear Area Defense FY 1979-98			
System	Development*	Investment	Operation	Total
	(millions in FY 1978 dollars)			
CHAPARRAL FLIR/POST--	$24.1	$ 190.9	$1,024.3	$1,239.3
HAWK----------	3.6	247.3	1,673.4	1,924.3
ROLAND----------	29.0	1,523.3	1,302.3	2,854.6

*Costs committed prior to FY 1979 are not included.

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Further analysis showed that for essentially the same cost, 72 ROLAND fire units, 27 HAWK fire units, or 162 CHAPARRAL/FLIR/POST fire units could be fielded for a period of 20 years. Thus a force of 72 CHAPARRAL/FLIR/POST fire units which produce effectiveness equal to 72 ROLAND fire units does so at less than half the ROLAND cost. Another important consideration is the life cycle unit cost of the alternative systems. For example, based on 20 years of deployment, a ROLAND fire unit would cost $31.2 million while a CHAPARRAL fire unit would cost only $9.7 million. HAWK is more expensive at $92.1 million, but fewer fire units are needed to accomplish the mission. The life cycle cost of the HAWK force is considerably less expensive than the ROLAND force.

In its deliberations of how best to provide divisional air defense, the Army conducted a study which included the preferred SHORAD missile system based on quantified cost and operational effectiveness. The study showed that the greatest need for a SHORAD missile system in the Forward Combat Divisions is during clear weather. CHAPARRAL with FLIR and POST proved most effective at least cost. The study also showed that under most environmental conditions, CHAPARRAL/FLIR/POST provides effectiveness comparable to or greater than that provided by so-called all-weather alternatives. (ROLAND was one of the all-weather alternatives considered.) The all-weather alternatives produced only slightly better results in the most adverse weather for significantly increased cost. The study recommended that FLIR and POST improvements to CHAPARRAL be expeditiously developed and procured for the active Army divisions. The Army has decided to retain CHAPARRAL as the division SHORAD missile system and to incorporate the recommended FLIR and POST improvements.

The Army conducted a High and Medium Altitude Air Defense (HIMAD) study to assist in planning and developing programs for the introduction of PATRIOT into the inventory and for future planning of HIMAD force requirements. The study addressed the air defense family of weapons, including HIMAD, SHORAD, man-portable systems, and Air Force interceptors. The study concluded that PATRIOT is the key to providing adequate air defense and should be deployed as quickly as possible. It also concluded that HAWK should be retained to complement PATRIOT at least until sufficient numbers of PATRIOT are deployed.

In addition to ROLAND not being cost effective, it will not meet the projected 1988 threat without substantial improvements to its capabilities.

Status of Alternative Systems

Funds for upgrading CHAPARRAL to the FLIR/POST configuration have been approved. The FLIR improvement is in development and is to be fielded in December 1983. The POST seeker, an improvement on the target acquisition system, is currently in development and Army plans call for initiating development for CHAPARRAL in FY 1982. The seeker is to be fielded in FY 1987.

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The Army is also improving the HAWK system which will significantly increase the system's firepower and low altitude capabilities.

The ROLAND is limited to providing point defense of a few selected assets in the European theater rear areas. The Army studies discussed earlier show that this requirement can be satisfied by HAWK, ROLAND, CHAPARRAL/FLIR/POST, or by some composite of these systems. Since CHAPARRAL will be retained as the division SHORAD and HAWK has been selected as the PATRIOT complement, it seems logical to select one of these systems to fill the nondividional SHORAD requirement. The retention of either system would simplify training, maintenance, and support requirements within the Army. ROLAND's 20-year operation and support is estimated to cost over $3 billion (FY 1981 dollars), and evidence gathered by the Investigative Staff indicates that ROLAND will impose an undue burden on the Army's logistics system.

Although the Army plans to buy four ROLAND battalions, only two battalions will be deployed in Europe. The other two battalions will be deployed in the United States to establish and maintain a training and rotation base. The Army contends that the two U.S. battalions will be available for reinforcement of the European battalions and support of the Rapid Deployment Joint Task Force (RDJTF). However, a complete ROLAND fire unit can only be transported by the C-5 aircraft, and considering the services' problems with quickly moving hardware from the United States to Europe, the Investigative Staff believes that it is highly questionable whether the United States deployed fire units could be moved to Europe in time to support the battalions already deployed and the system is certainly questionable as an RDJTF supplement.

A ranking OSD official told the Investigative Staff that he believes the Army should buy no more than two battalions of ROLAND because of the cost of providing a stateside rotational base. The Investigative Staff believes that procurement of even two battalions is not justified.

The Army's own studies show that the ROLAND system is not cost effective and that an alternative system will provide equal or better defense at much less cost within the same time frame that ROLAND will be available. Moreover, additional R&D costs not yet identified to the Congress, will be required to make ROLAND effective against the projected 1988 threat and makes this system even less attractive. The Investigative Staff believes that based on the limited mission role of ROLAND, its high cost and duplicative nature, further funding of this system is not justified.

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A summary of this information was furnished the Secretary of Defense during his appearance before the Subcommittee to discuss

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the FY 1982 Defense appropriation request. He provided the following reply for the record.

RESPONSE

The ROLAND Program has been terminated. The Army intends to assemble fire units from the components previously procured to deploy with the Rapid Deployment Force to provide it a limited modern air defense capability.

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Report of September 23, 1981

THE PATRIOT AIR DEFENSE MISSILE SYSTEM

The PATRIOT air defense system has not moved directly from development to full-scale production as planned when the Secretary of Defense approved acceleration of this program in 1977. Instead, limited production has been approved with increased production rates dependent upon the results of a special OSD-directed test program. This program is designed to demonstrate that hardware and software problems identified during operational and development testing have been resolved before proceeding to full-scale production. DOD has, however, requested funds in the FY 1982 budget to provide an option to increase the production rates from 6 to 12 units if warranted by the OSD-directed test results. The Investigative Staff reviewed the FY 1982 plans for increasing production based on testing progress and other issues of concern involving PATRIOT. Full-scale production (18 fire units each year) is not scheduled until FY 1983.

FY 1982 Procurement Plans and Testing Progress

The Army's FY 1982 procurement plan is to award a contract for six fire units and to procure the materials for six more by November 1981 based on the results of tests which are scheduled to be available at that time. The balance of the contract, including assembly of the six additional fire units, would then be finalized about October 1982 based on the results of a Component System Design Confirmation Test (C/SDC). The C/SDC tests are particularly important because these will be the first tests conducted using production equipment to verify that performance demonstrated with development equipment has been retained. The final C/SDC test results are not scheduled to be available until about September 1982. Because the final test results will not be available until late in the fiscal year, this raises the question of whether the funds for the additional six fire units ($373 million) are required in FY 1982.

The Investigative Staff found that while this question could not be answered conclusively, approval of funds for the additional fire units appears to be a prudent risk. There are a number of considerations involved in whether the additional funds should be authorized. These considerations are: (1) DOD believes there is a high probability of the system being successful in test unit three based on system fixes already made during units one and two testing, (2) DOD has stated that the funds for assembly of the additional six fire units will not be authorized until the C/SDC test is successful, and (3) the Army estimates a savings of about $10 million in FY 1982 if sufficient funds are provided to permit procurement of 12 fire units instead of 6. These savings result from spreading support and overhead costs over a larger quantity on a pro rata basis.

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Preliminary reports on the software demonstration during unit one tests indicate that the established test criteria generally was met. The results of a large-scale search/track mission in unit two tests indicate substantial improvement in various system functions (surveillance, track management, etc.) over that experienced during earlier operational/development tests. Complete unit two test results were scheduled to be briefed to OSD officials during the summer of 1981. The Investigative Staff believes that if unit two tests are successful, this should reduce the risks associated with unit three tests. Units one and two tests are the contractor's and project office's method of verifying that the system is ready for formal test and evaluation which is to be done in unit three by independent testers.

Additional Requirements for PATRIOT Batteries Not Included in the Army's Air Defense Plan

The PATRIOT force included in the Army's air defense plan (ADE-90) does not provide for meeting all of the Army's requirements for PATRIOT or equivalent systems. (NOTE: The Investigative Staff's review of the ADE-91 briefings indicated no changes for PATRIOT from the ADE-90 plan.)

The Army's plans currently provide for retaining I-HAWK fire units until PATRIOT is fully fielded. However, the PATRIOT or equivalent battalion requirements has not been presented to the Congress. DOD has deferred a decision until at least FY 1983 and perhaps later because of affordability problems on how it intends to satisfy these requirements.

The Investigative Staff believes that the Army should provide the Committee with information explaining how it intends to satisfy these requirements and identifying the potential acquisition costs involved. The Investigative Staff believes this is particularly important because the studies show a number of options exist for filling the requirement such as additional PATRIOT's, a variant of PATRIOT, a HAWK variant, or other. If the Army's decision were to acquire additional PATRIOT's, the Investigative Staff believes this would require more economic production rates than the current 18 per year.

Increased Production Rates Could Lower Unit Costs

Over about a 15-month period (December 1979-March 1981), estimated production costs for the PATRIOT system have increased from $4.2 billion to $6.3 billion, an increase of $2.1 billion. Average unit production costs have increased from $40.9 million to over $61 million during that period (escalated dollars).

The Investigative Staff found that when OSD approved aceleration of production of PATRIOT in November 1977, the planned full-scale production rate was two fire units each month, or 24 each year. Current production planning rates and related program cost estimates,

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however, are based on only 1 1/2 fire units each month, or 18 each year. This has resulted in significant increases in program and unit costs. For example, at least $229 million of the increased costs of over $2 billion are attributable to using the lowered production rates in the Army's current cost estimating model. OSD estimates that a reduction of one fire unit increases the cost of the remaining units to be procured by about 2 percent since support labor and overhead must be spread over a smaller base.

The Investigative Staff believes that the cost and time needed to field the PATRIOT can be reduced significantly by considering higher rates of production for PATRIOT. The Investigative Staff is aware that a potential disadvantage of increased production rates is that peak year funding would be required and PATRIOT would have to compete for funds with other systems. However, since the PATRIOT is the Army's number one air defense priority, it should have little difficulty in competing. Another factor of significance that may affect the current planned production rate is foreign sales requirements should NATO countries decide to purchase PATRIOT from the United States.

The Investigative Staff believes OSD should investigate the feasibility of more economic production rates and submit the results to the Congress prior to requesting funds for full-scale production.

Questionable Need for "Contingent Liability" Funds

The FY 1982 PATRIOT budget request of $900.5 million includes $40 million for a "contingent liability." This figure was obtained by simply adding 5 percent to all other estimated costs. The PATRIOT Project Manager has stated that the funds are needed due to changes in inflation rates (actual rates experienced are higher than estimated in the budget). Other Army officials stated that these funds will be applied, as needed, to accommodate requirements not known at the time of the FY 1982 budget request and that some examples might include: increased and/or changed test requirements, ability to respond to previously known test results, inaccurate prediction of inflation, new requirements, etc.

The Investigative Staff notes that although FY 1982 is the scheduled third year of production for PATRIOT, this is the first year that "contingent liability" funds have been requested. The Investigative Staff also recognizes that considerable funding turbulence has occurred in the PATRIOT program as a result of such actions as the deletion of $100 million from the program in FY 1981 and the unplanned for OSD-directed test program. This turbulence is evidenced by the FY 1982 amended budget which includes about $116 million for "catch up" funding.

The Investigative Staff believes the need for the $40 million is questionable for the following reasons: (1) approval of these

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funds would subvert OSD guidance on inflation rates and, in this regard, PATRIOT is not different from other programs, (2) the program should be more stable since FY 1982 is the third year of production, and if additional test programs are required above that already planned, this would suggest very serious problems, and (3) savings of perhaps $10 million would be available for a "contingency" if the quantity of 12 is authorized in the budget and OSD approves the increased production quantity. The Investigative Staff further believes that if "other increased requirements" were to arise beyond that requested in the FY 1982 budget, this should be handled through reprogramming actions.

USE

A summary of the above information was furnished to the Secretary of Defense at the time of his appearance before the Subcommittee to discuss the FY 1982 Defense appropriation request. His formal reply is shown below.

RESPONSE

PATRIOT is programmed for an economic production rate of 18 fire units per year by FY 1984. Tests, to date, have been successful. The $40 million requested by the Army for contingent liabilities, termed "questionable" by the report, has been reduced by $25 million by the Authorization Committees. Also see pages 358-362 of the hearing record.

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Report of September 23, 1981

U.S. ARMY ATTACK HELICOPTER, AH-64

In the FY 1982 amended budget, the Army has requested $92.2 million in RDT&E and $464.1 million in APA funds for this program. System deficiencies in the AH-64's Target Acquisition Display System makes the total weapon system capability questionable. A procurement decision should be delayed until these deficiencies are resolved.

Introduction

An in-depth review of the Army's AH-64 Attack Helicopter program has been completed. As illustrated in testimony before the Committee, the Investigative Staff found the flight performance characteristics of this helicopter to be superior. However, several system deficiencies still exist that impact the AH-64's capability to successfully function as a "war machine." In the FY 1982 amended budget, the Army has requested $92.2 million in RDT&E and $464.1 million in APA funds for this program.

Target Acquisition Display Sight (TADS) Anomalies

Of foremost concern is the uncertainty encountered with the aircraft's TADS. The TADS is the very "heart and soul" of the AH-64's ability to acquire, identify, range, and designate targets for its three weapon systems--the HELLFIRE missile, 30mm Chain gun, and 2.75 rockets. It represents state-of-the-art technology and exhibits all those growing pains inherent in other advanced avionics and electro-optic developments.

The contract for maturity development of the TADS was awarded to the Martin Marietta Corporation as a cost-plus incentive fee contract and, predictably, costs have escalated more than 100 percent using this type of contracting. Martin Marietta officials admit that in the heat of competition, they underbid the contract at $45.8 million, or as commonly heard, they "bought in." Subsequent problems boosted that cost figure to the latest revised estimate of $92.3 million. Although Army changes in scope of the program added slightly more than $1 million to the contract, Martin Marietta's problems in fulfilling the contract constitute the major cause of the overrun. Examples of major cost additions are:

(1) increased work shifts to meet schedules--$4.4 million;
(2) automatic test equipment and planning--$6.6 million;
(3) program management--$4.3 million;
(4) technical problems and/or schedule problems--$4.4 million--specific definitions are lacking.

Problems with the TADS manifest themselves primarily in the Forward Looking Infrared (FLIR) and laser (subsystems of high

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technology)--the FLIR is the worst performer. In the competitive development stages, the TADS experienced some constructive growth in its reliability, improving from 21 to 41 flight hours mean time between mission, (MTBF) abort failures. The Army in its OT-II testing of the production versions of the TADS set a goal of 45 hours MTBF for the TADS. This compares to an ultimate expectation of 100 hours MTBF at 100,000 flight hours after fielding. At this point, the Army goal of 45 hours MTBF for the TADS at OT-II is not yet met.

Without an operational TADS, the AH-64 pilot or copilot-gunner must perform all necessary aiming functions for the 30mm gun and 2.75 rockets manually, employing "Kentucky windage" factors to successfully hit targets. In the case of the HELLFIRE missile, the AH-64 pilot without an operating TADS must depend on external sources to designate targets with a laser beam to insure target destruction. These external sources are: Ground Laser Designation Device (GLDD); a Scout helicopter; or another AH-64. The Investigative Staff, after reviewing the tactics to be employed in use of the GLDD, believes its survivability on a modern battlefield is in serious doubt. Current Scout helicopters have no laser designator capability--although the Army is projecting a very costly Advance Helicopter Improvement Program (AHIP) to give them such a capability. As for the use of other AH-64's to designate targets for an AH-64 with a nonoperational TADS, the Investigative Staff believes such a task would not be feasible in a high threat environment where each AH-64 helicopter will likely be fully engaged in designating its own targets.

While Army officials appear quite optimistic that the production model of the TADS, currently undergoing operational testing, will "mature" and achieve an acceptable level of operational capability, current statistics do not tend to bear this out. A review of test data compiled by the Army's Operational Testing and Evaluation Agency (OTEA) revealed that as of July 19, 1981, there had been 309 total maintenance incidents, 94 (30 percent) of which were TADS related. Only 57 of the 94 TADS incidents were scored by the Army against the TADS as "chargeable malfunctions."

A review of the total hours credited to testing of the AH-64 showed 4,206.51 hours were pertinent to the tests; of these, the TADS was fully operating 134.00 hours and on "standby" (no action) 1,347.97 hours. Assuming the TADS would have been totally operational during all of the "standby" time, a total of 1,482.05 hours comprises the fully mission capable time. Thus, under this criterion, the TADS is fully mission capable 35 percent of the total time. Fully mission capable is indicative that everything is working at the same time. The Investigative Staff was told at the outset of briefings that fully mission capable numbers were the same as "functional reliability" numbers. However, prior to the second scoring conference on July 27, 1981, the Army decided to omit "functional reliability" numbers in its findings because of the vagueness of its wording. OTEA officials described

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it as "disastrous." The term "mission capability" became the focal point. The governing factor of mission capable is "if a system or subsystem can perform at least one of its mission essential functions and is not in active maintenance, then it is not considered down." For an aircraft with three major weapons systems and three missions, described by the Material Need Statement, the terminology "any one of its mission essential functions" appears to be Army satisfaction with 35 percent mediocrity.

Questionable Scoring Procedures
During Operational Testing

The Army system of "scoring" test data (incidents and/or failures) is, in the opinion of the Investigative Staff, rife with opportunities for abuse. Scoring is accomplished through a series of Scoring Conferences with membership comprised of representatives from the AH-64 Program Manager's office, OTEA, the Army Material and Systems Analysis Agency (AMSA), and the Army Training and Doctrine Command (TRADOC), with TRADOC having two votes, one of which represents the "tie breaker."

The Investigative Staff believes the practice of having the Program Manager's office represented on the Scoring Conference can well lead to undue influence being exerted by an activity with such a vested interest in the program as to cloud objectivity of the scoring. Such an observation is not limited to the AH-64 program. Investigative Staff members currently reviewing the M-1 tank program have identified a similar situation within that program.

Shortfall in Programmed Goals
During Operational Testing

Operational testing of the AH-64, to date, has fallen short of its programmed goals. Only 6 of 30 accomplished trials have been validated. OTEA officials advised the Army could not provide even an estimate of how many of the remaining (24) trials could be validated. Even in the event validation of the remaining trials could not be achieved, OTEA says it could not extend the OT-II tests beyond August 28, 1981, due to the following reasons:

(1) OTEA must compile the available test data for the Army System Acquisition Review Council (ASARC) decision--not due until November 1981;
(2) Fort Hunter Liggett facilities are scheduled for other activities; OTEA has other demands on the Air Defense Artillery Threat Simulator (ADATS).

The Army is adamant that the ASARC decision be made on schedule--November 7, 1981--with the subsequent Defense System Acquisition Review Council (DSARC) to be held in early December, so adamant, in fact, that the ASARC-DSARC schedules are driving OT-II testing schedules rather than the logical approach of

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complete testing prior to a decision. Army officials believe the system has shown sufficient maturity in OT-II testing to warrant such a decision. The Investigative Staff does not concur in such an opinion and believes that ASARC decisions should be withheld until all OT-II testing, especially that associated with the TADS, has been accomplished.

In August 1981, Martin Marietta officials advised the Investigative Staff that Martin Marietta had just submitted to the Army a production proposal for the TADS. This proposal was fixed price and performance specification warranted--a highly unusual tactic for such a state-of-the-art system as TADS without maturity caveats. The Investigative Staff is concerned that such a proposal may leave the Army contracting officers preempted for negotiation. It also provides Martin Marietta the lucrative option of renegotiating previously acquired production options with the Army should a production decision be thwarted or reasonably delayed beyond the December 1981 DSARC. Martin Marietta officials welcome a delay because renegotiations would obviously provide a more lucrative profit margin than they have yet to enjoy under current contractual arrangements. The Investigative Staff is further concerned that the performance specifications cannot be achieved by the TADS, except as profit or loss to Martin Marietta, should such a proposal be accepted by the Army. Who would the Army turn to to provide a TADS for its helicopter? Further, what contractor would want to pick up the pieces of such a system after such a proposal has failed?

Failure to Test 30mm Gun and 2.75 Inch Rockets

While the AH-64 is advertised as a three weapons system helicopter, only the HELLFIRE will be fired for accuracy during OT-II testing, with only 12 of these missiles scheduled to be "live fired" during this test. The Army advised that the 30mm Chain gun and 2.75 rockets will not be scored for accuracy because the Army, allegedly, cannot afford the cost and time to instrument the range to conduct these tests; instead, an OTEA evaluator will give an estimate based upon the percent of hits he thinks the systems got in the area of the target. High-ranking Army officials advised the accuracy of the 30mm gun and 2.75 rocket systems will be bench-tested in a stable ground environment--not from a flying platform. The Investigative Staff questions the validity of such testing to determine combat capability of these systems.

Survivability Issues

Survivability of the AH-64 in a high threat environment continues to concern the Investigative Staff. It does not have an air-to-air missile capability, and the Army appears to be ignoring that the AH-64 is a likely target of the Soviet HIND "E" atttack helicopter. The Army acknowledges the AH-64 can be easily modified to accept an existing missile such as the "STINGER." The Investigative Staff believes the Army's reluctance to recognize the viability of this threat primarily centers on concern about

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additional costs being associated with the already very expensive unit production cost--believed to be between $10.5 million and $13 million and a delay in a production decision. Hughes Helicopter Company, the prime contractor, has not provided a production cost for this system as of the writing of this report. Marine Corps Aviation officials advised the Investigative Staff that they believe the threat is very real and are taking positive action to fit their COBRA with SIDEWINDER--a very effective air-to-air missile to counter the threat and will do likewise to their planned buy of the AH-64.

Maintenance Issues

Army "green suit" maintenance schemes for the AH-64 may be more complicated than is forecast. The Army AH-64 program manager testified before the Committee that 2,705 (45 percent) of the maintenance tasks are provided at the unit level, with only 1,721 (29 percent) performed at the intermediate level and an additional 1,604 (26 percent) accomplished at the depot level. While these statistics may be impressive as far as unit maintenance capability is represented, the figures are highly misleading since a significant portion of those tasks performed at the unit level are very simple, i.e., changing light bulbs in the cockpit, checking gearbox oil, etc. The major effort of repairing broken parts, such as those in the avionics area, is done at the intermediate level of maintenance. According to some Army officials, approximately 75 percent of the actual repair effort will be accomplished above the line unit level. Additionally, during OT-II, contractors provided 16 percent of all malfunction maintenance on the AH-64. OTEA officials advised that while OT-II maintenance is intended to be a total green suit operation, they made a conscious decision to permit contractor maintenance when it became apparent that an inordinate amount of time would be expended if the Army were to accomplish the maintenance.

USE

A summary of the above information was furnished to the Secretary of Defense for comment during his appearance before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. He provided the following reply for the record.

RESPONSE

No basic design deficiencies have been identified in the Target Acquisition Designation Sight (TADS) which make the capability of the entire weapon system questionable. Some specific design changes to enhance performance, producibility, and reliability are planned for the production configuration. However, these have been assessed as low risk and will be completely evaluated and tested prior to the first production delivery.

The reference to a 100 percent cost growth pertains to a growth in the development contract from $45.8 million to $85.5 million and is not indicative of the production unit cost.

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COMMENT

The response as much as admits there are design deficiencies in the TADS. What other reason could there be for, "some specific design changes to enhance performance, producibility, and reliability" in the production configuration? As to the contention that the risk associated with these design changes is "low," it is believed an appropriate response would be, Where have we heard that before? It is also noted with interest that the redesigned production version of the TADS will require additional evaluation and testing, thus incurring more costs, prior to delivery. The purpose of citing the cost growth in the TADS development contract (we never represented it was indicative of the production unit cost) was to highlight to the Committee the difficulty involved in producing a piece of equipment with the characteristics desired by the Army as well as Army ineptitude in its management.

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Report of September 23, 1981

KC-135 AERIAL TANKER REENGINING ALTERNATIVE

The Committee expressed concern about the relationship between acquisition planning and costs of procurement. An analysis of the reengineering of the KC-135 aerial tanker addresses this relationship and shows that a cost-effective alternative is available.

Background

In order to meet its global aerial refueling responsibilities, which have doubled and continue to grow since the introduction of the Boeing KC-135 aerial tanker, the Air Force intends to retain its 23-year-old KC-135 fleet beyond the year 2000. Powered by a first generation turbojet engine the KC-135 is performance limited fuel inefficient, unreliable, and difficult to maintain. Currently, the 645 KC-135's utilize one-eighth of all Air Force fuel consumed and their J-57 engines have been reworked and overhauled so many times that they can no longer be economically repaired. The primary performance limitation is that a J-57 powered KC-135 is restricted below its maximum designed takeoff gross weight about 80 percent of the time. This limitation greatly effects the aircraft's range, endurance, and altitude capabilities which further impacts the amount of fuel which it can carry and offload to receiver aircraft. Air Force officials advised the Investigative Staff that these performance deficiencies and high maintenance costs directly relate to the J-57 and not to the airframe, which in itself poses little limitation to continued use.

The Air Force has received Congressional approval for two programs designed to address this problem. The first is designed to simply keep the KC-135's present J-57 engines serviceable and flying through the turn of the century, but with no improvement over the current performance limitations. The second approved program is to reengine the KC-135 with an advanced technology engine, the General Electric/SNECMA CFM-56, which would greatly increase its performance. However, because of the high cost of this program when applied to all of the 645 aircraft, Congress has directed the Air Force to continue to seek cost-effective reengining alternatives to the CFM-56 powered KC-135.

Available Alternatives

The Air Force has advised the Investigative Staff that they have reviewed two additional options designed to insure the continued use of the KC-135. The first, which directly relates to reengining the KC-135, is the replacement of its J-57's with a well-proven, but used commercial airliner engine, the

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Pratt and Whitney JT-3D. The JT-3D is not only an inexpensive alternative but it would also improve operational performance. The second option would be to relieve the mission workload of the KC-135 fleet by purchasing additional McDonnell Douglas KC-10 advanced aerial tankers.

All of the options have been considered in light of the Air Force's projected mission requirements and the resultant aerial tanker shortfall. Three options directly deal with the KC-135's present J-57 engines.

The first, called Pacer Grade, would involve extensive component replacement in order to halt any further decline in the J-57's already degraded performance and to improve its reliability. This modification would insure that the engine could be maintained through the turn of the century. Pacer Grade would only improve fuel efficiency by 2 percent and aircraft performance not at all. This option is estimated to cost $1.4 million per aircraft.

The second engine option would involve the replacement of the KC-135's present J-57's with the CFM-56, a high technology, high bypass ratio turbofan engine. The CFM-56 would provide the aircraft with a substantial increase in performance and improved fuel efficiency. For a mission over 2,500 nautical miles radius the CFM-56 powered tanker could offload 67 percent more fuel than its J-57 counterpart, while incorporating improved takeoff performance as well as a 25 percent reduction in fuel consumption. Each CFM-56 powered aircraft would save about 180,000 gallons of fuel a year. Current Air Force plans call for the reengining of 252 KC-135's beginning in 1984 or 1985 at a cost of about $11.2 million per aircraft (FY 1981 constant dollars and exclusive of spare parts and support).

The third and newest option is to reengine the KC-135 with commercially proven JT-3D turbofan engines. This reliable and well-matured civilian engine provides the Air Force with a cost-effective alternative to reengining the entire fleet with the expensive CFM-56 and/or performing Pacer Grade modificatiosns. This option recently came to light as a result of the large number of JT-3D powered Boeing 707 airliners being forced into retirement by Federal Aviation Administration and Environmental Protection Agency stringent noise and smoke requirements. Air Force use of the JT-3D is exempt from these Federal environmental regulatory requirements and in fact, the JT-3D is more environmentally acceptable than the present J-57. The JT-3D is similar to the Air Force's well-proven TF-33 turbofan engines with about 80 percent of its parts already Federal stock listed. Air Force evaluation of the JT-3D indicated that the engine would allow continued use of the KC-135 through the turn of the century. Air Force officials feel that at least 200 Boeing 707 JT-3D powered aircraft--enough to reengine about one-third of the KC-135's--could be obtained out of the estimated 400 due to be retired worldwide by 1985.

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Once purchased, the Air Force would remove the four JT-3D engines and 33 other systems from each Boeing 707 and place them on individual KC-135's. Parts and subsystems left over from the conversion would either be utilized as spares for KC-135 and other Air Force aircraft or sold for salvage. Compared to a J-57 powered KC-135, one KC-135 with JT-3D engines would have a 20 percent increase in offload refueling capability during a 2,200 nautical mile radius mission, as well as a two to fivefold increase in engine reliability and a 12 to 14 percent improvement in fuel efficiency. Each JT-3D powered KC-135 would save approximately 90,000 gallons of fuel annually. The operational benefits of this conversion can be translated, depending on the particular mission, to mean fewer tankers, more fuel available for offlaod and/or longer mission times. One scenario, involving deployment of four F-15 Eagle fighters from the United States to Germany, showed that it would take seven J-57 powered tankers 39 flight hours utilizing 550,000 pounds of fuel to support them. Powered with JT-3D's it would take only four KC-135's flyi 24 hours and burning only 230,000 pounds of fuel. Thus, the JT-3D powered tankers frequired 43 percent less aircraft, 38 percent less flight hours and 58 percent less fuel to support a typical transocean fighter deployment.

The Air Force currently can purchase used Boeing 707's for a cost estimated between $1.1 and $3.5 million each depending on the model or series. Air Force officials felt that as the retirement deadline approached these aircraft prices would decrease. The cost to convert each KC-135 is about $1.6 million. Thus for an estimated cost of between $2.7 and $5.1 million (exclusive of spare parts and support equipment), the Air Force can acquire a JT-3D powered KC-135. Air Force officials indicated that, while life cycle cost anaylsis is not yet highly defined, JT-3D conversion will bring about a high degree of cost effectiveness, as well as life cycle cost savings and rapid payback. Payback for the JT-3D conversion is estimated to occur at the 6-year mark. In addition, reengining KC-135's with the JT-3D negates the need for the $1.4 million Pacer Grade modification. This cost avoidance offsets the JT-3D conversion cost anywhere from about one-third to one-half, depending on the actual aircraft acquisition cost.

The Secretary of Defense has recently advised the President that DOD's FY 1983 budget submission will include a $1.1 billion initiative for reengining the KC-135. According to Air Force officials, this initiative is currently based on a proposed request for 72 or more aircraft which will either be reengined all with CFM-56's or with a mix of DFM-56's and JT-3D's. Not included in this figure could be a request for $166.4 million in long lead funding to purchase eight additional KC-10's. Air Force officials refused to provide the Investigative Staff with additional details concerning their recommendation to the Secretary of Defense. Nor would they comment whether the JT-3D reengining would be an interim or final solution for reengining a portion of the KC-135 fleet. It would take the entire KC-135 fleet until

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1996 to be reengined with the CFM-56. Because of the long length of time involved, the Air Force left open the possibility that the JT-3D reengined aircraft could again be reengined with the CFM-56 towards the end of the century. Whether an interim or final solution, the JT-3D reengining could be initiated in a very short time frame, thus quickly addressing critical tanker shortfalls. Air Force officials estimated that for a cost of under $200 million they could reengine 60 to 80 KC-135's with JT-3D's by the end of FY 1983. A similar reengining with CFM-56's would take until 1985 or 1986.

The purchase of commercial Boeing 707's and the subsequent use of their engines and other subsystems provides the Air Force with a cost-effective alternative to providing Pacer Grade modifications while quickly addressing KC-135 aerial tanker shorfalls. If the JT-3D is the final reengining solution for a substantial portion of the 645 KC-135's--200 aircraft--it would also have the benefit of the engines and conversion cost alone for 200 CFM-56 powered KC-135's would be approximately $2.2 billion, while the same number of JT-3D aircraft would cost between $0.5 and $1.0 billion--a potential savings of from $1.2 to $1.7 billion.

The Air Force should fully address the cost-effective JT-3D reengining alternative in order to offset the high cost of reengining 645 KC-135 aerial tankers with CFM-56 engines. In essence, the Air Force must look at the composition of its aerial tanker fleet as it relates to actual and projected mission needs and requirements. The Air Force should provide Congress comparative cost and performance statistics for individual KC-135's with (1) Pacer Grade modifications, (2) CFM-56 engines, and (3) JT-3D engines. In addition, the Air Force should provide mission requirements and cost statistics for the fleet mix of Pacer Grade, CFM-56 and JT3D KC-135's, as well as KC-10's, it expects to have in the aerial tanker fleet by each year beginning in FY 1983. Finally, the Air Force should apprise the Congress of its intentions concerning whether or not the KC-135 JT-3D reengining is a final or interim solution, and if the latter, whether it will be reengined with CFM-56's in the mid-1990's.

USE

A summary of this item was included in Part 9 of the subcommittee Hearings on DOD Appropriations for 1982 and the Department of Defense was asked to respond.

RESPONSE

The Secretary of Defense responded that the various KC-135A reengining alternatives were thoroughly analyzed using the following criteria: capability, life cycle costs, environmental factors, integrated logistics support, and overall program adequacy. After a 2 year formal Source Selection Evaluation which considered the TF-33 engine (military version of JT3D),

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reengining with the CFM-56 engine was chosen as the most cost effective method for reducing tanker shortfalls and for resolving the deficiencies of the J57 engine. Fuel efficiency of the CFM-56 as compared to the less modern JT3D significantly influenced life cycle costs, and performance capability of the CFM-56 far outweighed the JT3D. The JT3D reengined tanker is equivalent to 1.2 KC-135As, while each CFM-56 reengined tanker produces 1.5 KC-135A equivalents. The greater capability of the CFM-56 was a prime consideration and is considered absolutely necessary to help reduce the overwhelming tanker shortfall. In addition, the JT3D does not meet the 1985 standards for noise or pollution. Although the military is presently exempt from these standards, reengining a substantial part of the KC-135 fleet with this known deficiency is cause for concern. The cost-benefit relationships of a fleet mix of KC-10, KC-135/CFM-56, and KC-135/JT3D vary appreciably with the scenario and operations plan being executed. Of the various options examined, reengining with the CFM-56 best satisifies operational requirements in a cost effective manner while meeting energy, environmental, safety, and efficiency goals. Twenty year tanker life cycle costs comparing the KC-135A, KC-135/CFM-56, and KC-135/JT3D were provided to the chaiman of the House and Senate Appropriations and Armed Services Committees in correspondence from Brigadier General Buford D. Lary, Deputy Director, Legislative Laision, in early December 1981. Also see pages 36 and 37 of the hearing record. Congress appropriated $56 million in procurement funds and $29 million in operating funds for fiscal year 1982 to reengine the KC-135 with JT3D engines. These funds will be used to reengine 28 aircraft.

DISPOSITION

The Committee considered the report and DOD's response and directed that the Air Force would continue to pursue the JT-3D effort as well as the CFM-56. Accordingly, the Committee has set aside in the bill $103.5 million from Aircraft Procurement, Air Force, for KC-135 re-engining. All or a portion of this amount can come from within the funds requested for KC-135 re-engining. This amount should purchase 40 to 46 kits (used 707 aircraft). An addition of $46.8 million to the operation and maintenance appropriation is made to install up to 36 kits during FY 1982.

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RAPID DEPLOYMENT JOINT TASK FORCE (RDJTF)

The concept of a Rapid Deployment Joint Task Force has evolved from a force of light divisions capable of rapid response to contingencies throughout the world, to a very costly, unified command for Southwest Asia. Program costs are currently estimated at $17 billion but will likely be higher. There is no approved operational plan in existence as yet for the RDJTF, and joint planning has been marred by interservice rivalry and infighting. The primary constraining factor on the RDJTF's potential for success is transportation, especially the woefully inadequate airlift. Planning for the Maritime Prepositioning Ships program as well as sealift support, in general, in many instances appears to consist of ill-conceived, urgency driven, stop-gap measures that either do not fulfill requirements or are contrary to them. Duplicative and potentially costly communications planning shortfalls are also in evidence.

Procurement of some RDJTF scenario dependent requirements should be held in abeyance until the need is specifically identified through an approved operational plan. Savings realized from elimination of ill-conceived sealift support programs alone (some of which the Navy now also questions) could total $779.5 million. An additional $520-615 million savings would accrue by elimination of certain communications projects that cannot be justified based on REDCOM/RDJTF communications requirements.

By directive dated February 2, 1981, the Committee requested the Surveys and Investigations Staff to conduct a major investigation of the procurement practices of the Department of Defense and all components thereof. The study was to be broadly based to include not only major investment items funded in the procurement appropriations but also consumables funded in the operation and maintenance appropriations. The investigation was to be continuing with interim reports submitted to the Committee on specific matters as information becomes available.

This section addresses these issues (particularly the DOD material requirements determination process) as they relate to the development of the Rapid Deployment Joint Task Force. In addition to requiring near-term funding of approximately $5 billion annually to build the RDJTF into a viable force, the RDJTF has been in the forefront of the movement to invest billions of dollars over the next several years in servicewide readiness issues.

Background

The Rapid Deployment Joint Task Force was established to plan for a general purpose force of light divisions capable of responding to worldwide contingencies, but primarily to be used against

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local forces or those projected by the Soviet Union in the Middle East, the Persian Gulf, or Korea. This mandate was given to the military services at a time when they had not yet recovered from the weakening effect on the strength of the forces caused by the Vietnam conflict. It was also a time of soaring inflation when the Nation's concern was to increase social programs at the expense of national security.

Within this climate of opposition to increased military spending, the services were expected to develop plans for a mission uniquely different than anything done in the recent past; in an operational area including few allies, negligible military facilities, and extremely limited host nation support; and using existing forces that were already committed to one or more plans for other operational areas. With the exception of the availability of funds, these conditions still exist.

Composition

Most of the forces assigned to the RDJTF for planning come from the U.S. Army's Forces Command and the U.S. Air Force's Tactical Air Command. These assignments are made through the U.S. Readiness Command (REDCOM). As presently defined, Navy and Marine Corps general purpose combat forces will be in support of, but will not be under the operational control of the RDJTF. If the Marines become part of the land force, they will come under the operational command of the RDJTF.

Airlift for exercises or force deployment is provided by the Military Airlift Command, and in-flight refueling for the airlift is provided by the Strategic Air Command which will also provide a strategic bombing force, if such support is required for the mission. Elements of these Specified Commands are not assigned to the RDJTF but will support the RDJTF mission by direction of the Joint Chiefs of Staff (JCS). Sealift for force deployment is provided by the Navy's Military Sealift Command. Movements over land in the continental United States are provided by the Army's Military Traffic Management Command.

Since the RDJTF concept is a drastic departure from traditional military thinking of the last several decades, i.e., NATO and Korean scenarios, it has become a dynamic learning intensive vehicle throughout the Department of Defense with extensive ramifications in the areas of planning, command and control, readiness, communications, host nation support, strategic and tactical mobility, and prepositioning.

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Mission Inconsistencies

As with other U.S. forces deployed around the world, the primary purpose of the RDJTF is to deter aggression by projecting U.S. power rapidly. The projection has to represent a credible force sufficient in size and firepower to address the threat, yet compact enough that it can be deployed into the area in time to deter the threat. The intent is force economy, i.e., to contain and discourage further aggression with as small a force as necessary.

The concept for an RDJTF has been and is in a continuing state of flux. Initially, the intent was to create a light, fast moving, self-sustaining, general purpose force composed of light divisions with sufficient firepower to respond to worldwide contingencies threatening vital U.S. interests, especially those in the Middle East, the Persian Gulf, and Korea; i.e., a Marine Amphibious Brigade or an Army Airborne Division or a task group composed of elements of both. Subsequent to the Soviet invasion of Afghanistan, Southwest Asian scenarios, including a full scale 22 division Soviet invasion of Iran and full mobilization of U.S. forces, became the primary focus for RDJTF planners and the composition of the force began to change. Additionally, the previously assumed benign entry environment, supported by host nation invitation was redefined to a permissive environment with host nation invitation either given or assumed. This change in assumption indicates some resistance to an RDJTF entry may be encountered and that force deployments may have to be made under hostile conditions. Accordingly, the RDJTF, due to elemental changes in concept brought about by current Defense Guidance, is steadily evolving into a large, slow moving, heavy, firepower intensive force which will require a major resupply effort and increased support by all commands in preparation for a potential worldwide engagement with the forces of the Soviet Union.

Funding Growth

The identified costs related to the Rapid Deployment Joint Task Force program have increased from $484 million in FY 1980, to $4.5 billion in FY 1982. The Secretary of Defense, when he submitted the 1982 budget in January 1981, estimated the total cost of the RDJTF program at $17.4 billion. The Investigative Staff believes this is a conservative estimate. Considering the recent additions which have been made by the current administration, the cost of this program could approach $25.0 to $30.0 billion by FY 1987. Obviously, the estimates can vary widely depending on what portions of the many readiness items are designated as applicable to the RDJTF; however, in view of the strain already placed on U.S. conventional forces by worldwide commitments as well as the obviously high cost of even conservative program estimates, the Investigative Staff has concluded the RDJTF (as currently configured) should be reexamined with a view towards its practicality and affordability.

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Major items in the FY 1981 supplemental and the FY 1982 budgets (total approximately $6.0 billion) have been examined from the standpoint of needs and requirements for readiness and sustainability in the near term and increased capability in the far term related to prepositioning, strategic mobility, and regional basing programs intended to enhance deployability.

The Investigative Staff found that the requirements for many of the items in the FY 1981 supplement and the FY 1982 budget are justified by the need to improve the overall readiness of the general purpose forces not just the RDJTF.

Funding requests for unit equipment, ammunition, and spare parts, including those for the RDJTF, are based on total service requirements, not on separate organizational needs within a particular component or command. Equipment purchased with funds for a given fiscal year will generally become available over the following 2 years and will be distributed based on service priorities at that time. Of the material purchased with FY 1980, 1981, and 1982 procurement funds, some portion will certainly go to the RDJTF but, budget justifications to the contrary, the amount is not readily ascertainable at this time.

Requirements for other items are justified on the basis of operational needs unique to Southwest Asia such as water and camouflage items, critical communications equipment, helicopter survival equipment, and medical support.

The need for still other items is to a great extent scenario dependent and subject to frequent change because the operational plans are in a continuous state of development. For example, tank trucks for water have been replaced by deflatable bladders on flatbed tractor-trailers, and extensive water needs are planned for in a Saudi Arabian area of operation whereas the water needs in an Iranian area of operation are moderate.

There are other items such as the SL-7 container ships and the Maritime Prepositioning Ships which are peculiar to or directly related to the RDJTF program. An examination of initiatives related to RDJTF sealift requirements suggests that the Department of Defense in a rush to "do something" has requested funding for some items for which there are no requirements and for others which are ill suited for the purpose intended in the environment in which the RDJTF is expected to operate.

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In the absence of an approved operational plan that defines the force to address the threat, it is extremely difficult to justify the specific need for certain material requirements that are scenario dependent or based on planning that is continually changing. The Investigative Staff is of the opinion that funding requests for these types of items should be held in abeyance until the need is specifically identified.

Command Relationships

Currently, the RDJTF is responsible in peacetime for contingency planning for Southwest Asia. During planning, joint training exercises, and preparation for employment, RDJTF is under the operational control of REDCOM.

The Joint Operational Area of Southwest Asia is an area that overlaps the responsibility assigned to EUCOM, which commands the land and air forces in the area, and the Pacific Command (PACOM), which commands the sea forces in the area.

Command relationships within a single service are complex enough, but when a joint task force, consisting of elements of the four services is created, organization and coordination problems among the unified and specified commands take on a much more critical dimension. The JCS has been working on the issue for over a year and a half to find a workable solution. The White House, as well as members of the Congress, also have expressed concern over the command and control structure of the RDJTF.

Although the RDJTF is a subordinate command of REDCOM, in the event of deployment and employment, the RDJTF could report directly to the National Command Authority (NCA) or to the NCA through the JCS. If directed to report through the JCS, it could be a new unified command or a component command under the direct control of REDCOM, EUCOM, PACOM, or as otherwise determined by the NCA.

The EUCOM was considered by most of the Chiefs of Staff to have a legitimate claim on the area even though it must concentrate mainly on preparing for land war in Europe. The Marine Corps argued for placing the RDJTF under the Pacific Command because the Navy has the ships and know-how for rushing Marines and other troops and their gear to the Persian Gulf.

The Commander-in-Chief, REDCOM, initially proposed that his Command be given area responsibility for the Middle East and Africa and the RDJTF mission. More recently, the Commander, RDJTF, advocated the creation of a separate unified command in Southwest Asia over the next 3 to 5 years, a proposal the Investigative Staff understands was initially vetoed by the JCS, but subequently approved by the Secretary of Defense.

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The Commander, RDJTF, proposed that the force not only should be solely committed to Southwest Asia, but also established as a separate unified command in which command relationships would be shorter, more clearly defined, and much less cumbersome than they are currently. The Commander also believed a unified command designation would further facilitate the RDJTF mission by fostering greater Arab cooperation in obtaining host nation support agreements. Additionally, it would be a positive signal to the Arab nations of the importance the United States places on its national interests in that area of the world.

The initial step toward a solution to this dilemma was an announcement on April 24, 1981, when the Secretary of Defense indicated he intends to establish a new and separate unified command for the Persian Gulf area which will report directly to the NCA through the JCS. To implement this plan, the JCS proposed that the RDJTF Army force be comprised of the 18th Airborne Corps as the Army component command element. Operational elements of this unit consist of the 82nd Airborne Division, and the 101st Airborne Division (Air Assault). The JCS also proposed that the RDJTF Air Force forces consist of a headquarters element from the 9th Air Force and 11 tactical fighter squadrons. No combat support units have been identified for assignment to the RDJTF. As presently recommended, Naval and Marine Corps forces will be in support of, but will not be under the operational control of, the RDJTF. The Navy force will be colocated with PACOM at Pearl Harbor. Carrier Task Force 70 (a carrier battle group) and one Marine Amphibious Force have been assigned to the RDJTF for planning and training only. No final decision by the Secretary of Defense has been made on this JCS proposal.

In the interim, relationships among the present unified commands will not change nor will the RDJTF mission change. It will continue to have a potential for worldwide deployment, but its major focus will remain on Southwest Asia.

The Investigative Staff believes that in the decades ahead, it is likely that the vital interests of the United States will change from area to area as geopolitical factors continue their evolution. Therefore, once the RDJTF is transformed into a unified command with responsibility for Southwest Asia contingencies only, the United States will still have a continuing need for a rapidly deployable force capable of responding to contingencies threatening U.S. interests in other areas of the world.

In view of the U.S. vital interests in Southwest Asia, it would seem prudent to proceed to establish a unified command for that region of the world, especially if long-range forecasting predicts with a high degree of confidence that there is a major threat to U.S. interests. However, if the recent decision to establish such a command was made merely to settle a jurisdictional dispute among existing unified commands it would be an extravagence

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the Nation can ill afford. In this connection, the Investigative Staff has not evaluated the merits of the decision to establish a separate unified command for that region of the world nor the costs that such establishment will entail. Additionally, a conscious decision needs to be made as to whether this new command can fulfill two missions effectively, that is, to be able to protect U.S. vital interest in Southwest Asia as well as to respond rapidly worldwide to contingencies threatening U.S. vital interests elsewhere.

Planning

It is generally recognized that in the immediate future, the threat to U.S. vital interests in Southwest Asia is more likely to be of low intensity generated by some internal conflict or terrorist activity than one of high intensity generated by the Soviet Union.

Southwest Asia is a region of the world where the United States lacks allies, where there are negligible U.S. military facilities, and where access to existing host nation facilities is rather limited. This area has been described as about the size of the continental United States with a wide diversity of terrain and climatic conditions, ranging from formidable mountain ranges of Iran to barren desert wastelands of the Arabian peninsula, from subzero temperatures to +140 degrees Fahrenheit in the shade. It is some 7,000 air miles or some 12,000 sea miles by way of the Cape of Good Hope from the east coast of the United States.

These conditions have placed difficult demands on planners and logisticians as illustrated by a comparison of current capabilities of U.S. forces in Europe with those of any U.S. force deployed to Southwest Asia.

Western Europe has sizable U.S. forces in-place, large amounts of prepositioned supplies and equipment for reinforcement, command and control systems in-place, an extensive in-place logistics infrastructure, many host nation support agreements, and numerous military allies. The capabilities in Europe which have been built up over a period of 30 years are nonexistent in Southwest Asia.

Tracking the status and direction of planning for the RDJTF has been extremely difficult. Although it began about 18

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months ago, the planning is a dynamic, iterative process with a built-in momentum, involving multilevels of detailed planning and coordination.

Built into the planning process, which is based on a worst-case, 22 division Soviet invasion of Iran scenario, is the assumption that any lesser threat can be addressed by applying portions of this larger planned force. Aside from the RDJTF headquarters planning primarily for command and control, responsibility for detailed operations, logistics, and mobility plans has been delegated to service components designated for that purpose.

The concurrent development of individual plan segments by various service components has been influenced by service biases and service interpretation of their respective roles and missions. In addition, because the strategic lift capability is extremely short of what is needed, the plans are continually being revised in attempting to balance operational requirements with available lift capability. These variations, together with the changes in concepts, highlight the need for strong central direction, supervision, and coordination to synchronize the plans with the force and support requirements.

All the operational and logistical planning is based on scenarios which are structured on a set of specific assumptions. Although the various scenarios describe the force size, the force mix, the time available for warning and deployment, and the expected duration of the conflict, it is the size and capabilities of the available lift assets which ultimately determine the basic parameters of the operational plans. According to the Commander, RDJTF, the task is to rapidly deploy combat power--personnel, equipment, and necessary logistics support--phased in a manner which will allow the in-theater forces to effectively engage an enemy at any stage of the deployment.

None of the several operational plans being developed have yet reached the point of final approval by the JCS. The first or show-of-force plan, which assumes a benign environment with no forced entry (previously discussed) has been reviewed by the JCS and returned to the RDJTF for use as "lessons learned" and is being used as a framework for subsequent planning. The second or major plan is with the JCS for concept review and consideration of service review comments. Some of these, about a dozen, are substantive; some deal with doctrine; some with tactics; and some with bed down, fuel, and munitions for the Strategic Projection Force, which are still undecided. After concept review, it will be returned to the RDJTF for revision, if necessary, and resubmitted to the JCS for final review in about September 1981 after another refinement of the Time Phased Force Deployment List. After JCS approval, it will be forwarded to the operational components for validating and refining the supporting plans which will be due in about November 1981.

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While the five separate plans for Southwest Asia are all single contingency plans, the Investigative Staff has been advised by knowledgeable officials that events such as those which would precipitate an RDJTF mobilization rarely occur in a vacuum. Additionally, the Defense Guidance for FY 1983 through FY 1987 and the Defense Policy Guidance for Southwest Asia dated June 15, 1981, mandate planning for near simultaneous contingencies. In fact, due to the limited response capability of the RDJTF, escalation is frequently recognized as a consequence of an RDJTF force confronting a determined Soviet invasion of Iran. In response to the guidance, the JCS is in the process of developing a mechanism to coordinate the planning among the unified commands to respond to near simultaneous contingencies. Until such time as the mechanism is developed and operable, the U.S. response to anything but a single contingency will be essentially unplanned and uncoordinated.

Airlift Shortfalls

Two critical factors early on are adequate response and strategic airlift to get deployed forces in-place in time to meet the threat. Army commanders at the staff, corps, division, and brigade level are convinced that strategic airlift capability is insufficient for today's RDJTF. They also acknowledged that without adequate out-year programming, the force size will continue to be constrained. In addition to the shortfalls in mobility equipment, the Air Force's ability to perform the rapid deployment mission is severely constrained by the inadequate spares situation and the uncertainty of access to bases and facilities capable of support operations.

The critical question is how well the initial surge for deployment meets the daily flow requirements for early arrival and employment. In the absence of prepositioning and assured host nation support, the answer to this question, airlift, is the difference between success and failure.

Due to the current shortage of strategic air lift assets, as well as material handling equipment, and in the absence of near-term host nation support that would permit proceeding with design, construction, and utilization of prepositioning facilities, the planning staffs are continuously reworking and revising the Time Phased Force Deployment List in order to balance the operational requirements with available lift capability. The RDJTF also recognizes the need for further study on the potential problems of airport and seaport saturation and distrib tion.

Sealift Shortfalls

The interim implementation is the seven ship Near-Term Prepositioning Ships (NTPS) program which includes the equipment and 15 days' sustainment for the 7th Marine Amphibious Brigade (11,200 Marines) plus some Army and Air Force ammunition. As originally conceived, the NTPS program would be abandoned when a more viable

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solution could be executed. This more viable solution, the Maritime Prepositioning Ships (MPS) program, was to have the advantage of extensive planning, not only to accommodate the ships to the operationally required equipment and supplies as these requirements were identified, but, also, to coordinate the design of these ships with the conditions anticipated in the theater of operations.

Unfortunately, the "extensive planning" in many instances appears to consist of ill-conceived, urgency-driven, stopgap measures which either do not fulfill requirements or are contrary to them. In fact, it seems that some program sponsors are attempting to force the operational requirements to fit their particular concept of sealift and prepositioned ships.

The augmentation of the NTPS with the TAKX is justified by design features which are of questionable value.

-- The TAKX can offload in stream, but only in moderate-to-calm seas which exist a majority of the time in the Persian Gulf, but not in the Indian Ocean.

-- The TAKX can be spread loaded to help minimize the effect of ship attrition. However, the RDJTF scenario presumes a benign or permissive environment.

-- Cargo maintenance can be performed more easily on board, eliminating the necessity to offload for this task. Yet current assessments indicate cargo maintenance will only be required every 2 years, the same interval required by the U.S. Coast Guard for ship drydocking and maintenance.

-- The TAKX can launch amphibious vehicles. However, it has no amphibious assault role, and amphibious vehicles are limited to 5 to 10 percent of the total vehicles on board.

The procurement of these ships has been limited to ships built in the United States, in spite of the probability that cheaper, more suitable, foreign-built ships may be available. By limiting the procurement decisions to the ships currently under consideration, it is doubtful that delivery dates will approximate those desired. In fact, the decision to complete the construction of three of these ships before converting them to Roll On/Roll Off (RO/RO) ships is being made on the basis of the participating parties' inability to properly account for the construction funds, the shipbuilder's funds, the Government's construction differential, and the Navy's conversion funds.

The FY 1982 amendment included $50 million in Navy Operations and Maintenance (O&M) funds for the activation of five National Defense Reserve Fleet ships for the prepositioning of ammunition for the RDJTF. However, the Navy now plans to delete this program from its request. Some of the reasons given for this action: (a) reactivated Victory ships are inadequate for ammunition storage, and (b) the ships are too vulnerable.

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Likewise, the Navy is considering the elimination of $7 million for the Barge Tender Program from the Navy's O&M funds in the FY 1982 amendment because the requirement no longer exists due to changes in the maintenance cycle on the NTPS program.

The Navy's initiative to acquire a Seabee Barge Carrier (TALS) may be justified by some Navy scenarios, but since offloading in-stream is a planned MPS capability, the need for TALS becomes questionable. Reconsideration of this program could eliminate from the FY 1982 amendment $6.5 million of Navy O&M funds and $54 million in acquisition costs from SCM funds.

The SL-7 Program entails the purchase of eight container ships dedicated to Army use. Although these ships are capable of 33 knots, they will only be operated at 27 knots in order to conserve fuel and minimize enroute refueling problems. The plan calls for positioning these ships at U.S. ports in a ready-to-load-and-go status in the event an overseas contingency arises. Even though the JCS, the Army, and the Military Sealift Command cannot agree on the number of ships required, the costs identified to the SL-7 program include $210 million for the purchase of six ships plus $452 million for the conversion of six ships (in the FY 1982 amendment for Navy SCN) to a roll-on/roll-off configuration.

RDJTF and the Office of the Secretary of Defense officials agree that the SL-7's could not get into those Iranian ports being considered in the various RDJTF scenarios for Southwest Asia due to their deep draft and present port conditions. Additionally, REDCOM believes it essential that the fast sealift ships be capable of unloading away from shore and moving cargo across unimproved beaches or through combat-damaged or otherwise compromised port facilities.

Upon learning that the SL-7 would operate at 27 knots vice 33 knots, the Investigative Staff identified 12 ships in the U.S. merchant marine inventory with speeds of 24 to 26 knots and believed comparable in size to the SL-7's. Officials at the Maritime Administration were requested to furnish information on these ships. The Investigative Staff was told that release of the information requested was being held in abeyance pending authorization by high-ranking officials of the Maritime Administration.

<u>The Investigative Staff believes that the SL-7 program should not move forward until the following issues are resolved, including the consideration of more suitable alternatives:</u>

-- The SL-7's are touted for their 33 knot speed which will not be exploited because of range/fuel problems.

-- The number of ships required for the Army is uncertain.

-- The SL-7's for Southwest Asia will require deep water ports a requirement which will severely limit their usefulness in that area.

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-- The ships have no capability to unload away from shore, a capability REDCOM believes essential.

Very fast sealift ships and craft of the surface effect family have great potential for use in the shallow water ports and adverse littorals of Southwest Asia. The Investigative Staff concurs with the Office of the Secretary of Defense (OSD) and the Congressionally Mandated Mobility Study recommendations that development programs for these ships be continued with emphasis on logistics usage. The Navy, however, does not share this enthusiasm and chooses to abandon further developmental efforts in this area.

Communications

Requests for funding support for procurement of communications equipment justified wholly, or partially on REDCOM RDJTF requirements contained in the FY 1981 supplemental budget, the FY 1982 budget and the FY 1982 Amended Budget were reviewed. The requests were generally found to be well justified based on overall general purpose forces requirements, ie. the equipments requested are to replace obsolete items, provide reserve units with equipment that will be compatible with active units, and to meet requirements which are currently inadequately supported.

Interviews with the command general and staff of REDCOM, the Army Communications Command (ACC), and staff officers of OSD (C3I), the Defense Communications Agency (DCA), the Air Staff, the Chief of Naval Operations, the Marine Corps, the Air Force Communications Command, and leading industrial firms revealed a number of situations believed to be of interest to the Committee. These are presented below:

-- There is no firm basis for long haul communications planning, programming and budgeting in the principal area of REDCOM interest, Southwest Asia (SWA).

-- Service responsibilities for long haul communications into SWA have not been assigned. Long haul communications, the (Defense Communications System [DCS]), is generally provided into and within a geographic area by the service that is predominate in that area. For example, the Air Force is predominate in Japan, England, and Alaska, and they plan, program, and budget to install, operate, and maintain the DCS in those areas. While exceptions to this geographic division of responsibility for provision of DCS are made based on operational or economic considerations, each service has geographic responsibility (turf) which is acknowledged by the DCA and the services. SWA and Africa are not recognized as the responsibility of any one predominate service. Thus, presumably each service must plan to support itself. Air Staff officers state their planning is on dead center since the Secretary of Defense announcement that a unified

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command is to be established for SWA. No planning guidance has been provided the services. Army communications planners believe, in the absence of clear responsibility for long haul communications to SWA, they must unilaterally plan for Army long haul service. The Navy is planning a long haul system into Mombasa, Africa. Planning must be supported by program and budget actions. The opportunities for duplication of effort by the services in this situation are obvious.

-- Several senior communicators have stated that if ordered into SWA tomorrow, long haul communications would be provided with tactical equipment rather than relatively inexpensive, high capacity for commercial type equipment normally employed for DCS.

-- An approved DOD doctrine is required for communications support of a Communications Zone (COMMZ) for SWA. A COMMZ is that area between the ports and the combat units. It includes storage points, port facilities, rail and pipe lines, maintenance units, and transportation. No approved doctrine for communications in this area presently exists. The Defense Communications Engineering Center (DCEC) has been tasked to develop a concept for communication support of a COMMZ and a communications grid down to the combat units. This effort, known as the Joint Multichannel Trunking and Switching System (JMTSS), is being conducted in isolation. The Army Communications Command, which would implement the concept, has not been contacted concerning the concept, much less invited to participate in the plan they must implement. This "disconnect" presents the possibility of an engineering solution being prepared for problems not yet defined.

-- Without a formally approved joint doctrine, there is no basis to support equipment requirements to implement a program to support a COMMZ.

Use of existing Government communications systems in SWA could reduce the requirement for DOD equipment. The European Command has been tasked to evaluate existing in-country communications systems in SWA and report on the potential use of them by a U.S. task force. The study is not yet completed. Should the study find significant in-country capability exists and could be made available, it could impact the amounts and types of U.S. equipment required to support a deployed force.

The Ground Mobile Forces (GMF) may not be allocated sufficient capacity in the DSCS satellites to meet their requirements. The answer depends on the DOD community questioned and the type of analysis performed.

GMF is a term which encompasses satellite terminals used to support tactical communications requirements from brigade through Army component headquarters. It also includes earth stations supporting the Tactical Air Control System of the Air Force.

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FY 1979 through FY 1983 funding profiles indicate Army plans to spend $213.3 million to procure 227 earth stations. The Air Force plans to spend $253.7 million for 101 earth stations during the period FY 1981 through 1985.

The Assistant Chief of Staff for Automation and Communication, Headquarters, Department of Army, has performed an analysis of Super High Frequency (SHF) satellite capabity and its ability to satisfy channel requirements of all DOD tactical users.

The organization charged with controlling GMF operations in the field is convinced that the DSCS allocations do not provide the required capacity to operate the large number of ground terminals in the inventory and on order or planned.

It is not clear that the allocation of DSCS capacity in support of GMF is adequate. The conflicting data available, the vital importance of satellite communications to the GMF, and the magnitude of current GMF procurement programs emphasize the importance of carefully analyzing the GMF requirement and allocating capacity according to jointly agreed upon priorities.

The expenditure of $520 million to $615 million to place three new UHF Fleet Satellites in orbit cannot be justified based on REDCOM channel requirements.

The Navy has requested directly from the House Armed Services Committee (HASC) and the S ate Armed Services Committee (SASC), funding support for Fleet satellite 6, 7, and 8. This request bypassed the normal OSD and Office of Management and Budget review, examination, and weighing against other requirements for DOD dollars which normally occurs in the Program Objective Memorandum (POM) cycle.

The Navy justification for procuring three additional Fleet satellites is based in part on the JCS and Navy belief that REDCOM has a requirement for 17 channels. REDCOM's requirement for 17 satellite channels is not substantiated by their operational plans, and the Navy's use of 17 as a planning device for total

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Ultra High Frequency (UHF) satellite channel requirement is unsupportable. A 17 channel requirement implies long term UHF usage and support of two major contingency operations simultaneously. The plans call for use of UHF only during transit and initial operations, with SHF being used after 72 hours. In view of recognized airlift shortages, the Navy believes it is unrealistic to plan the execution of two major contingency operations simultaneously.

-- REDCOM's Joint Communications Support Element (JCSE) has approved funding of $25 million for a modernization program in FY 1983 through FY 1987

This program is essentially the procurement of TRI-TAC equipment as it is fielded. REDCOM has no option. It must be equipped with equipment which is compatible with the services. The Investigative Staff questioned the reasonableness of supporting the TRI-TAC program in a report of April 1978 entitled "Review of the TRI-TAC Program." Cardinal arguments developed in that report, together with updating information are presented below.

-- The use of tactical equipment to support units/activities which will displace infrequently, if at all, is wasteful.

The planned use of TRI-TAC equipment to support Army operations to the rear of corps, Air Force high powered radar sites and single and multiwing air bases, and Defense Communications System installations are in this category. These operations are currently served by commercial equipment which is modified as required to meet military unique requirements. Some are shelter mounted. To replace the commercial switches serving these installations with TRI-TAC switches would triple the cost of switching. The mobility, ruggedization, miniaturization, and ability to displace and reestablish quickly are not required.

-- Update:

The TTC-39's in current programs are scheduled for issue to echelons above corps and for tactical air bases and Air Force component headquarters.

-- The TRI-TAC approach to voice security has been overtaken by technology, is expensive, and is inflexible.

The selection of a basic digital design for the TRI-TAC system was based on the technology available at the time of the decision to provide secure voice. Wideband was the only solution to providing reasonable quality voice encryption. Narrowband secure voice based on modern digital voice processing was not then viable. Since the decision was made to employ wideband, narrowband has

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matured and the advances in microprocessors have provided the means to support it.

Wideband secure voice requires modifications of switching equipment and wideband transmission, both of which are costly. It was estimated that modification of DCS switches in the United States to accommodate TRI-TAC secure voice requirements will cost $90 million.

Wideband secure voice will not operate on the narrowband national telephone networks of either the United States or Germany. This denies the services the use of these networks which are considered to be the most survivable communications systems in existence. United States forces in Europe make extensive use of the civil telephone systems. The German army tactical system is narrowband (analog), and is highly integrated into the national telephone system. The NATO secure voice system is analog. The United States Navy is restricted to narrowband secure voice due to its dependency on High Frequency (HF) radio and narrowband satellite channels for long haul communications. The Army and the Air Force also have significant numbers of HF radios. Wideband secure voice use is restricted to wideband systems. Narrowband may be used on any system except FM radio, and Navy experts are optimistic that this problem can be solved.

-- The advantages of digital design are not being realized in TRI-TAC equipment

The advantages of digital design are recognized as reducing costs, weight, and size. The TTC-39 switch costs three times more and weighs 1 1/2 tons more than the switch it will replace, the TTC-38. A C3I official, involved in the TRI-TAC program, could identify no TRI-TAC equipment which will cost less than the equipment it will replace.

-- The cost and complexity of TRI-TAC equipment is largely attributable to the hybrid approach to bridge from today's analog system to an objective digital system.

An attractive alternative is to equip one unit at a time with digital switches and terminal devices, rather than accommodate both digital and analog terminals on a hybrid switch. Interoperability between units equipped with different switches could be accomplished on a trunk basis (lines tying switches together). The Analog to digital conversion would be done inexpensively by the trunk circuits. This is the method used by industry and planned by the British Army. It would permit the use of digital switches which are much less costly and complex.

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-- The TRI-TAC concept of encryption is very expensive and provides only a marginal increase in security over the present, much less expensive technique.

The Army Signal Center made a study of the costs to provide end-to-end security for an Infantry Division or to provide end-to-end encryption (TRI-TAC solution). End-to-end security is obtained by placing the switchboard and its telephones in a physically secure area, such as a command post, which is the normal employment, and encyphering the radio or cable transmissions to the next communications node. Radio or cable intercept would yield only encyphered traffic. The TRI-TAC solution encyphers everything from calling to called telephone. The cost per division for the TRI-TAC end-to-end encryption was $82 million. Army planning is for a force of 24 divisions. The difference in cost for the total force is over $1 billion. Signal Center experts expressed their belief that the increased security resulting in the billion dollar increase in cost of the TRI-TAC approach was marginal.

-- Update:

Air Force is estimating the cost of COMSEC at $1.4 million per TTC-39 switch.

The report recommended the Committee consider the following actions:

"Direct the Secretary of Defense to reorient the TRI-TAC program as follows:

"1. Authorize changes to existing tactical systems and equipments only when significant, cost-effective benefits can be identified, until NATO develops, and member nations formally commit themselves to, common tactical equipments and/or technical specifications.

"Rationale: Major effort is being made in NATO to obtain required interoperability among the communications systems of its forces. Whether interoperability will be obtained by use of common equipment, or by interface specifications, or both, is yet to be determined. The British and French are producing new tactical digital systems; the German and United States systems are largely analog but both are planning digital systems.

"Technology, paced by large-scale integrated chip developments is moving so fast that new capabilities are becoming available almost monthly. It is impossible to foresee how an optimum communications system will be configured 7 years from now. The commercial communications industry is making changes to existing systems only where significant cost advantages are identified.

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"In this atmosphere of turbulence and uncertainty, a prudent policy would be to change our inventory systems only when significant operational requirements demand change. To field $5.0 billion dollars of new equipment under these circumstances would further complicate the NATO problem, and would limit the flexibility of the United States to negotiate commonality issues, due to the huge investment in a new system. Should the NATO system eventually agreed upon be significantly different than TRI-TAC, we would have fielded an "interim" system.

"2. Restrict the scope of the TRI-TAC charter to mobile, tactical equipments/systems required to support organizations and activities which in normal operation displace frequently and rapidly.

"Rationale: TRI-TAC equipment is planned for use by support operations which are semi-fixed. Army areas to the rear of corps, Air Force high-powered radar sites, and wing air bases are in this category as well as Defense Communications System installations. Slightly modified commercial equipment presently serves these types of operation. The use of rugged, miniaturized, mobile equipment in this role is wasteful. Commercial equipment can be truck- or van-mounted if requested.

"3. Authorize the use of commercially available equipment for operations which seldom displace.

"Rationale: Current OSD policy prohibits the procurement of other than TRI-TAC equipment for tactical requirements. This denies use of equipment with minimum capabilities required.

"4. Direct the employment of narrowband secure voice technology in the TRI-TAC system in lieu of the present wideband, except for use in FM radio nets. This exception should be withdrawn when the present technical barriers are overcome.

"Rationale: At the time of decision, wideband technology was the only means available to provide acceptable secure voice. In the interim, a narrowband technology has matured. A narrowband system provides much greater flexibility than wideband in that it can be passed over any telephone system and over HF radio. This is important to the Navy, which utilizes HF and narrowband satellite transmission for long-haul circuits, and to our forces in Europe which make extensive use of the German telephone network.

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"Congress has directed that the national level military and civil secure voice systems be narrowband because of its flexibility and cost advantages. The NATO and German army secure voice systems are narrowband. The narrowband technonogy to be employed in the national level systems should be considered for TRI-TAC.

"5. Insure that maximum utilization of commercial practices and standards is made in systems and equipments.

"Rationale: Deviation from accepted commercial practice and standards results in unique equipments which are significantly more expensive and complicates interoperability with civil systems and commercial equipments."

-- How can the Armed Forces equip their communications units in the most cost-effective manner? is a question posed to industry personnel. The following recommendations were offered:

"--Use commercial, off-the-shelf equipment wherever possible. The benefits are seen as drastically reduced costs and timely employment of new technology by the forces. A commercial switch slightly modified for military use, has been procured at a cost of approximately $1 thousand dollars per line. The TTC-39 switch will cost $10 thousand per line based on an estimated cost of $3.0 million. The communications equipment industry is extremely competitive. New technology is marketed as soon as it is proven.

"--Caution should be exercised in committing DOD to a specific long term system design. The common carrier industry is pointed to by many digital advocates as proof that an all digital system is viable today. An AT&T official noted that transition to digital actions of the common carrier industry are only taken when directly translatable into cost savings. Due to the extreme volatility of large scale integrated chip (LSI) technology, a major carrier is delaying the complete design of a digital system. LSI will allow some part of the switching function to be put in terminals. What and how much is yet to be determined. It is felt the optimum system has not yet been defined. Changes should be made only where a clear, definable advantage is identified.

"--Ruggedization requirements, which incur increased costs should be limited to the switches which actually need it. A major swtichboard manufacturer stated that any switchboard manufacturer can shock mount commercial switchboards and by exercising the degree of quality

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control warranted, produce the level of ruggedness required. Ruggedness is a function of quality control.

"--Eliminate Unique Requirements. Military communications equipment should adhere to commercial practice to the maximum extent possible. By doing so expensive development effort, unique test equipment costs, and the stockage of unique parts can be avoided. Unique requirements result in unique equipments and deny the benefits of buying in the mass market.

"--Separate digital and analog operations. The separate operations should be tied together by trunk circuits equipped for analog to digital conversion. This is common commercial practice. This will greatly simplify equipment and reduce costs.

"--A digital switch is the most cost effective switch to build. It costs less to build than an analog switch and is much more efficient.

"--Service, or functional, specifications should be used instead of engineering specifications. The cost of engineering staff effort would be avoided and the fabricator would have the flexibility required to employ innovative cost avoidance techniques. This is not possible under prescribed engineering specifications.

"--Military specifications should be applied to equipment only when necessary. The indiscriminate application of military specifications has unnecessarily driven up the price of many procurements in the past.

"--Changes to a prototype development should be prohibited. Changes should be incorporated only after user evaluation. Guarantees should be used to insure a prototype performs to operational specifications.

"--Data packages (Contract Data Requirements Lists) should not be procured routinely. These packages are equipment design data and are used for competitive procurements. If competitive procurements do not appear feasible, the data package should not be procured."

-- Update:

Slightly modified commercial switches are viable alternatives to the TTC-39.

The 11th Signal Group has employed a modified Western Electric switch on exercises for 5 years and its operators report excellent results. The White House Communications Agency uses a

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modified commercial switch to support the President when out of Washingt . This switch is air transportable and has been successfully u] in Rome, Madrid, Vienna, Venice, and is currently suppor ng the President at his California ranch. The cost of this switch configured to provide 348 lines, 20 tandem ports, and radio servic , and be transported in a standard S-280 shelter, is less than $500,0 . Northern Telcom estimates a mobile configuration of the Air Fo_ce standard fixed base switch, their DMS-100 would cost about $500,000 for a 300-line switch. This switch would include the features provided in the new standard Air Force switch.

Are the increased capabilities of TRI-TAC worth the increased cost? The Investigative Staff does not believe the use of TRI-TAC equipment is cost effective when employed at echelons above corps and at air bases. The use of slightly modified commercial equipment would reduce costs between 80 percent and 90 percent. (Based on the cost of TTC-39, versus commercially available switches mounted in shelters.)

Much of the communications equipment earmarked for the RDJTF support is so bulky and heavy that it requires a C-5 aircraft to lift it. The commanding general, REDCOM, feels this is unsatisfactory as the bulk of his airlift will be C-130's and C-141's. Actions are underway to repackage and downsize this equipment. The status of specific pieces of equipment is provided below:

-- Switchboard WECO 400. The Army staff is now identifying funds to reconfigure.

-- Standard Remote Terminal (SRT) for data traffic. A down-size prototype will be delivered in October 1982. This prototype will support the RDJTF requirement.

-- Secure Voice equipment configuration, MTC-11. Lexington Signal Depot is preparing specifications for its down-sizing.

-- Technical Controls GSQ-166 and/or MSQ-73's. These are planned to be put in commercial sea-land containers. The Tank and Automotive Command is currently attempting to identify vehicles to carry the containers.

Observations

Immediate actions are required to formalize service responsibilities for extension of the Defense Communications System into Southwest Asia and Africa in the event sudden operational needs require it. In the absence of such formal responsibility the services must unilaterally plan their own communications into those areas, with concomittant duplicatory effort, and procurement of equipment.

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The lack of a formalized doctrine and supporting plans for the COMMZ to support contingency operations must result in a piecemeal reaction if an operation is undertaken. The Army, Air Force, Navy, and DCA should jointly develop such doctrine as a matter of urgency. Service plans should then be prepared, based on the doctrine developed.

Antennae configuration and planned allocation of capacity of DSCS III may require revisions. A detailed analyses of requirements of the Ground Mobile Forces, together with planned allocation of capacity to support it is required. The Field Activity responsible for managing the capacity authorized for GMF use feels the presently planned authorizations are not sufficient.

The DSCS III is presently visualized as having one narrow beam antenna for GMF use. Army long haul communications operators feel two may be required.

The prescription by OSD of TRI-TAC equipment for rear echelon communications support should be examined to determine whether the gain in capability provided by TRI-TAC equipment is worth the vastly increased cost when compared to slightly modified commercially produced equipment.

Much of the 11th Signal Brigade equipment is too bulky to be transported in any aircraft other than the C-5's. The Army should expedite efforts to downsize this equipment.

11. Investigative Staff Observations

The RDJTF presently envisioned by the Department of Defense is a radical departure from the force as it was originally conceived. It has evolved from a force of light divisions capable of rapid response to contingencies throughout the world, to a unified command with large permanent forces, substantial quantities of prepositioned equipment and supplies, and an expansive logistical infrastructure.

This growth is occurring at a time when the Administration and the public seem more willing to commit large sums of money to protecting vital allied and U.S. interests such as Persian Gulf oil and to stemming the spread of Soviet hegemony in the free world. However, since the concept of a new unified command has evolved over the last few months along with incremental force increases and attendant material requirement additions, the Investigative Staff believes that the time has arrived in which the extreme cost of and commitment to this concept should be reevaluated in total, i.e., What are the priorities of a Southwest Asian command in relation to competing national interests, affordability, and the continuing need for a rapidly deployable force?

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USE

A summary of this information was presented to the Secretary of Defense for comment during his appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He provided the following reply.

RESPONSE

The report states that there is no approved operational plan for the RDJTF, airlift is inadequate, and maritime prepositioning and sealift support appear to be stop-gap measures. On October 1, 1981, the RDJTF was chartered to be a separate joint task force reporting directly to the National Command Authority through the Joint Chiefs of Staff. The commander of the RDJTF is now assigned operational planning responsibility for Southwest Asia (SWA). Although no new combat forces were created for the RDJTF, its commander has operational control over several Army units and Air Force tactical fighter squadrons. Our fiscal years 1983-87 program is designed to improve mobility of our forces and preposition adequate equipment and supplies to deploy and provide long-term support for these forces. The Marine Corps plans to preposition equipment aboard chartered ships beginning in FY 1984. We have placed a high priority on improving our airlift capability. To improve our sealift capability, we have placed a high priority on converting eight SL-7 fast sealift ships to a RO/RO configuration.

COMMENT

The Secretary's decision to establish the RDJTF as the Pentagon's sixth unified, multiservice command for Southwest Asia failed to reduce the basic military weakness which originally inspired the creation of the RDJTF. It would seem prudent to establish a unified command for that region of the world, especially if long-range forecasting predicts with a high degree of confidence that there is a major threat to U.S. interests. However, a conscious decision needs to be made as to whether this new command can fulfill two missions effectively, that is, to be able to protect U.S. initial interests in Southwest Asia as well as to respond rapidly worldwide to contingencies threatening U.S. vital interests elsewhere.

DISPOSITION

In the November 16, 1981, report on the 1982 Department of Defense Appropriation Bill, the Committee denied funding for the Seabee Barge Carrier--a decrease of $54 million from the budget request and reduced by $484 million the budget request for the SL-7 program. The Committee also expressed its concern that the Department's continued delays in following the Committee's direction not only fails to address the immediate requirements for rapid sealift, but now delays the overall conversion program.

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Report of September 23, 1981

CHEMICAL WARFARE (CW) PROGRAMS

Introduction

All the military services have acquiesced to the need for protective clothing and associated defense equipment regardless of what stand is taken on offensive chemical weapons. The Investigative Staff provided a report to the Committee in April 1979 entitled, "Chemical Warfare, United States and Soviet Union Postures" which discussed the chemical threat as well as U.S. defense policy. As detailed in this report, given known and suspected Soviet CW capabilities, there is no controversy whether we should buy or not, but rather what we should develop and buy. However, examination of procurement actions initiated by DOD in the past to obtain such protective clothing and equipment have disclosed instances of mismanagement, waste, and outright foolishness. Offensive chemical weapons, on the other hand, have an inversed situation, and there appears to be considerable controversy over the viability of the requirement for such weapons.

Binary Weapons

DOD has proposed to replace its old deteriorating chemical munitions with the new binary weapons. Funds totaling $22.1 million were appropriated in FY 1981 to build a binary production facility. This position assumes the United States needs an offensive weapon. There has been much controversy concerning this assumption. The prochemical side wants CW weapons to deter CW aggression. The antichemical people see the introduction of new chemical weapons as obstructing arms control negotiations and a potential treaty banning chemical weapons. Military authorities in Europe view any proposal to introduce new chemical weapons into the theater in the near term as politically unrealistic. Under these conditions, any new chemical weapons would have to be stored in CONUS, thus their accessibility for deterrence against a surprise chemical attack in Europe is questionable.

In support of the deterrent theory, DOD officials claim no nation capable of inflicting CW casualties has been attacked with CW weapons since World War I. They cite instances where chemicals were used only against those who could not retaliate in kind. Italy used CW weapons against Ethiopia in 1935 and Japan did the same against China in World War II. There have been more recent allegations of communist use of poisonous chemicals in Laos, Kampuchea (Cambodia), and Afghanistan. The Soviet military capabilities for CW engagement suggests an even greater peril.

The Soviet doctrine treats CW weapons and protective equipment as an integral part of their conventional combat forces. As many as 100,000 Soviet soldiers are trained specialists in CW offensive and defensive combat. Their soldiers are rigorously

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trained and become well acquainted with CW equipment. Also, the Soviet CW arsenal is extensive and believed to be more lethal than that of the United States. Many of their conventional rockets and missiles can be equipped with CW warheads. The Soviets also have aircraft deliverable persistent agents. Some persistent chemicals have a "sticky" base which makes decontamination arduously slow. NATO air bases as a result could be completely shut down. The Soviets are forerunners of combat vehicle collective protection systems where the NATO allies are only now experimenting in this area. The conclusion is obvious--the Soviets are capable of inflicting severe chemical casualties while at the same time fighting in contaminated environments. The threat is extensive.

The U.S./NATO CW offensive capability is reduced to our aging stockpile and governed by NATO strategy. The introduction of any new binary weapon obviously would improve U.S. capability.

Chemical Protection Equipment

DOD has been woefully short of chemical warfare protective equipment. In 1962, the Army abolished their technical commands including the Chemical Corps. After the reorganization, CW did not have a strong central sponsor and was reduced to a low priority profile. Since the Army is the lead agency for CW protective equipment research and procurement, the reduced priority spread to the other services.

In the mid-1970's, DOD began to recognize CW protection shortcomings compared to the Soviet's ability to wage chemical warfare. This lack of balance and suspected use of chemicals by the Soviets has rekindled DOD's fervor for buying protective equipment. The services are still trying to buy equipment to eliminate shortages, including those in war reserves. At the same time, there are many development efforts to improve or replace equipment.

Most of the equipment has shortcomings, but military sponsors are quick to explain that a chemical warfare environment is going to restrict every facet of military operations, and there are no easy solutions. They defend their equipment as being all that is available. That is, options are few. In the big rush to avert shortages, some questionable procurement practices have also occurred.

Protective Clothing

The protective clothing ensemble designed for ground personnel provides head-to-toe protection against chemicals, including vapors and liquids. Since some chemicals are absorbed through the skin, a gas mask alone is no longer sufficient. The ensemble includes a mask, hood, overgarment, overboots, and butyl gloves. While the Army has proved this ensemble is effective against chemicals, it is cumbersome and uncomfortable to wear. Heat buildup in above 70 degree weather would be excessive leading

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to heat prostration casualties. Consequently, in some environments, heat casualties might be as severe as those which would result from the chemical threat.

The mask has been criticized as ill-fitting, hot, and providing very limited vision. The Army, for some time, has been attempting to develop a triservice flexible mask ostensibly to eliminate these problems, but the experimental transparent element of the mask turns cloudy when exposed to chemicals. The availability of an improved mask is unknown at this time.

The hood covers and protects the head and neck area. The hood is a clothing-type item which normally would be purchased by the Defense Logistics Agency (DLA) but is not because the hood and mask are considered an ensemble. The hood is classified as equipment and not subject to DLA's purported more economical procurement system.

The overgarment is considered superior to the Soviet rubber garment for heat tolerances and dexterity. Nonetheless, in temperatures above 70 degrees, the suit becomes intolerable, leading to heat casualties as noted earlier. The Investigative Staff found the garment has not been a significant problem to troops training in the European theater where the average ambient temperature is moderate. Another problem is the combustibility of the outer garment. Since it will sustain burning, and ship fires are a primary hazard, the Navy needs a suit that protects from chemicals and fire. The other services are not as concerned about the potential combustibility, citing that most common clothing will burn. The Investigative Staff is still concerned that some occupational specialities, like fire fighters, may need other protection.

The overboots, which are a prime component of the protective ensemble, are so wretched that a testing laboratory official described the boot as "nothing short of a design abomination with all the due deference to an item that has to have been selected by committee exercise." The drawstrings are easily caught on undergrowth when used in the field, and the design is so poor that soldiers usually find themselves walking on the side of the boot rather than the padded bottom, causing the boots to wear out quickly.

The aircrew protective ensemble is significantly different from the ground forces' clothing and mask. The clothing still has all the discomforts of a ground forces suit but must allow better dexterity and peripheral vision for modern high speed aviation. At present, the Air Force has jerry-rigged helicopter pilot helmets for better vision and plastic "baggies" for overgarment protection. The U.S. European Command has very appropriately designated the aircrew protective ensemble as the number one priority for chemical warfare improvement.

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Protective Butyl Gloves

The Investigative Staff has made an in-depth inquiry into the procurement of chemical protective butyl gloves by the Defense Personnel Support Center (DPSC), Philadelphia, Pennsylvania, a division of the Defense Logistics Agency. This inquiry disclosed certain unorthodox procurement practices. It was determined that the sole supplier of the gloves received significant price advantages in initial contract negotiations which provided a competitive edge in subsequent solicitations; the lack of good planning by DPSC resulted in unnecessary delays in the procurement of the gloves which were in short supply; and at a time when it was judged necessary to have a second supplier to meet mobilization requirements, DPSC delayed implementing established DOD procurement procedures, resulting in the continuation of a sole-source situation.

The sequence of events began in 1978 when a noncompetitive letter contract was awarded in an effort to expedite production. During subsequent price negotiations, cost factors used by the contractor were questioned by the Defense Contract Audit Agency (DCAA). Contrary to DCAA's findings, the contractor was allowed accelerated depreciation of a new manufacturing plant, fixtures, and equipment, resulting in 84 percent of these capital investments being charged as overhead against the contract. This provided the contractor a decided advantage when competing for additional contracts.

A second contract was awarded to the same contractor as low bidder in a competitive solicitation. This award was preceded by several resolicitations which sought quick delivery, but eventually the contract was awarded on the basis of low bid.

A third contract was awarded to the same contractor as the low bidder even though DPSC was seeking a second source as a means to improve the butyl glove mobilization production base. Rather than act under authorities vested in DOD procurement regulations established for the purpose, DPSC attempted to obtain a second source through competitive bidding based on an accelerated delivery schedule. The sole supplier not only claimed ability to meet the proposed delivery period but also submitted the low bid.

DPSC's final attempt to obtain a second source for the gloves was initially stymied by legal action brought by the sole suplier, based on a technicality in procurement statutes. The matter has now been resolved in favor of DOD, but not until after considerable delay. Under appropriate DOD guidelines, DPSC recently proceeded to procure 3.2 million glove sets noncompetitively from the original supplier and a second source. DOD is also proceeding to eliminate the technicality in the existing law to prohibit future challenges.

The above matter might prove to be an isolated incident, but it does provide insight into the complexity of DOD procurement and justifies concerns of the Committee in procurement practices followed by the DOD.

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Antidotes--Nerve Agents

The nerve agent antidotes are all based on atropine alone or in combination with other drugs. Atropine treats the symptoms of nerve agent poisoning such as loss of body fluids and chest spasms. Atropine itself is a poisonous drug and must be used judiciously. Soldiers are issued two to three autoinjectors measured in relatively safe doses for self treatment. Although atropine has been the principal nerve agent antidote since World War I, it has been virtually untested on humans. To compound the problem, medical researchers do not know the type or composition of nerve agent an enemy will use or how effective any antidote will actually be on the battlefield.

Another antidote known as TAB was hastily fielded by the U.S. military. The Army now has strong doubts about the effectiveness and safe use of TAB, and the Army Surgeon General has recommended its rapid removal from the inventory. The Army medical community believes that TAB does not have enough atropine to effectively counter nerve agent exposure. Also, TAB contains an hallucinogen, and anyone using TAB would be unable to continue self treatment. If a soldier only thought he was exposed to nerve agent, a shot of TAB would incapacitate him for hours. There is also the potential for misuse since it contains an hallucinogen.

The Army will rid itself of TAB and the embarrassment of the situation by February 1982. The initial replacement will be atropine alone. Development efforts are ongoing for an oxime (2-PAM) to augment the atropine. Unlike TAB, 2-PAM was developed by U.S. medical research and will not contain an hallucinogen.

The actions of the Army as lead agent in chemical warfare will affect TAB stockpiles of the other services. The Marine Corps has large quantities of TAB in refrigerated storage and has not initiated budget action for replacement. Consequently, the Marine Corps will probably be the last to replace TAB, and it may not be in the immediate future.

The Marine Corps' inaction is supported by the Navy's Bureau of Medicine (BUMED). The BUMED believes that TAB is safe, effective, and has a 7-year shelf life. The belief is based on animal tests which are unacceptable to the Food and Drug Administration, another player with which the military must contend in developing an antidote. Because of inconclusive testing, the pro and con arguments of TAB will probably never be resolved. The dollar loss sustained by the Army's haste to field the antidote TAB is not substantial (approximately $1.4 million), but it could have been devastating if, in fact, it has been found to be ineffective.

The M51 Shelter

The M51 protective collection shelter was originally intended to be used by Army field commanders and communications

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centers as a safe haven against chemical attack. The combat forces found it unsuitable and the Army Medical Corps inherited the shelter by default. The shelter will be tested for medical field use in February 1982, which just happens to be 10 years after the M51 was type-classified for use by the Medical Corps. The Investigative Staff has not been able to obtain comment on this outrageous delay. Furthermore, there has not been a satisfactory explanation of just how this device will be used.

The M51 is an inflatable tent and air lock packed on a single axle trailer. The trailer also has a generator to inflate the shelter, circulate and infilter air, and provide marginal lighting. Power for other equipment must be augmented by a separate generator. The tent is rubberized to resist direct liquid agent contamination, whereas the filtering system and air lock prevent gas infiltration. The units are small, accommodating only 8 to 10 people, but two or more units can be linked together.

The European commands refuse to accept the M51 collective shelter. They contend severe logistics problems preclude effective use of the M51. They would need extra trucks to haul the trailer and additional personnel to set up, guard, and maintain the equipment. Because of the weight and logistics problems, no service is buying the shelter except the Army (the Canadians are testing it for a future buy). Also, keeping the shelter free of contamination has proven difficult. The Canadians tested the M51 in 1973 and discovered large levels of contamination. They claim the M51 failure was due to poor procedures. While they did not condemn the M51, they did not buy it either.

While all the infighting and testing of the M51 was going on, 356 of the 642 depot stock units were deteriorating. The Army is using four M51's to test the best way to restore the units. The Investigative Staff finds incredible the Army's ability to buy so many units of virtually unsought goods, and then allow the units to go to ruin, while looking for someone to use them. While the M51 may not be the answer to the military's dream, it is the only collective shelter available.

Automatic Chemical Detector (M8)

The Army plans to spend $67 million in FY 1982 to replace liquid-filled nerve gas detectors with ionization (dry) units. The M8 detector consists of the detector (M43), an alarm (M42), and a battery pack. Only the M43 detector will be replaced. The Investigative Staff has serious reservations about this procurement. The modernization is only a temporary replacement until an advanced ionization unit completes development; the ionization unit provides less detection capability than exists with the present liquid model; other devices on the market provide more capable detection and are less costly. The procurement of the ionization units in FY 1982 will also nurture a sole supplier which could stifle competition planned in future procurements of the advanced ionization model.

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The Army really wants an advanced ionization unit, but research and development on an advanced model will not be complete until about 1989. The advanced ionization unit will be more capable of detecting mustard gas and liquid nerve agents. The ionization units planned for procurement in FY 1982 at total cost of $67 million, are merely interim dry detection units designed to overcome the existing liquid detectors' 6-hour refill requirement. However, a modification kit is available today to upgrade liquid-filled detectors where refills will be needed only every 28 days. The kit will cost about $400 per unit compared to $2,915 per unit cost for the dry detection devices for a total procurement cost of only $9.2 million vice the $67 million for the dry unit, an initial procurement savings of approximately $57.8 million. While this initial saving will be offset to some degree, overall, the Army estimates the ionization unit procurement will cost as much as 25 percent more than costs associated with the liquid modification kits, including operations and maintenance costs.

Actually, this increased cost buys less capability. First, the ionization models, current and advanced, cannot detect blood agents as will the existing liquid fill detector. Additionally, a contractor is developing another modification which will improve the liquid units' detection ability by adding mustard gas to the list of detectable agents. The detection of mustard gas is one of the major improvements to the ionization model which will not be fielded before 1989. A modified liquid unit could be available as early as 1982.

The FY 1982 ionization detector buy may nurture sole source procurements. Since the interim ionization detector will be bought without competition, the contractor is in a position to absorb plant start-up costs through the initial contract and present a lower overhead cost when the Army competes the advanced model. This is one of the well documented ways that sole-source contractors can remain in the sole source driver's seat. The Army can easily avoid succumbing to the sole-source pitfall which is usually a disadvantage to the Government.

By investing in modification kits to the existing liquid units, the Army could save millions of dollars. The kits will rapidly improve field chemical detection capability by 1983 versus the 1989 target cited for the advanced ionization unit. The money saved could be used to simultaneously accelerate the advanced unit and foster competition between the two concurrent developers.

USE

A summary of the above information was provided to the Secretary of Defense at the time of his appearance before the Subcommittee to discuss the FY 1982 Defense appropriation request. His formal response is shown below.

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RESPONSE

The report states that military spending in preparation for chemical warfare has been limited in recent years to protective equipment and that some items procured seem to be an inadequate response to the Soviet threat. At present, the United States and its allies lack an effective chemical warfare capability. We are seeking to improve our capability. Research, development, and procurement efforts are being substantially increased and directed toward equipment that will provide better protection with less force degradation. New designs and materials will be necessary to overcome physiological heat stress and psychological burden of the present individual mask and overgarment as well as the loss of dexterity and tactility due to bulky gloves and boots. We also recognize the need to improve medical items, alarms and detection systems, and decontamination equipment.

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Report of September 23, 1981

DOD PROCUREMENT PRACTICES HAVE RESULTED IN ADDITIONAL COSTS AND ADVERSELY IMPACTED THE INDUSTRIAL BASE

The complexity of DOD contracting is increasing, not only because of the increased sophistication of the equipment and services that DOD is buying, but also as a result of an ever-growing number of legislative and regulatory actions which are designed for improved cost accountability and as tools to implement social-economic initiatives. DOD's ever-increasing procurement standards as stated in the Defense Acquisition Regulation (DAR) have also hindered other Government initiatives that could reduce procurement costs. As a result, an increasing number of business firms have also found it uneconomical to deal with DOD because of contractual complexities, or have passed on to DOD the cost of their increased administrative burdens.

DOD procurement officers have shown a strong propensity for using sole-source negotiated procurement as a matter of preference and convenience. These procurement officers prefer to have a product, on time, with few problems (regardless of cost) and feel a negotiated procurement is the best way to accomplish this goal. Despite the fact that the Congress prefers and the law prescribes that procurement will be by formal advertising, only about 11 percent of DOD's procurement funds are spent by this method. Contributing to this dismal record is the looseness in the requirements prescribed by the DAR for formal advertised procurements. The DAR provides 17 exceptions to the rules prescribed for formal advertising. Almost any situation is covered by these exceptions, in fact, several of the execptions may apply to any particular requirement. DAR provides a preference pecking order for the selection of the appropriate exception in order to keep the approval level as low as possible in the procurement hierarchy.

USE

A summary of the report was included in hearings held by the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. The Secretary of Defense provided responses for the record which are included in each of the following sections.

DOD's Foreign Military Sales (FMS) Program Competes with Commercial Sales of the Same Item

The DOD's directives governing the implementation of the Security Assistance Act, as amended, requires FMS customers to buy commercial-type items from commercial sources and not through the FMS program.

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Nonetheless, the governments of Venezuela, the Philippines, and Tunisia have approached DOD to buy commercial-type helicopters through FMS channels rather than commercial sources. The reason given for this preference is the likelihood of obtaining the items at FMS prices which are about 10 percent cheaper than the normal commercial price (to the detriment of the commercial contractors).

This situation occurs because commercial prices are subject to fluctuation during the early marketing of a new product for which there has been no substantial commercial sales. DOD, on the other hand, is required by the Defense Acquisition Regulation to perform a detailed cost and pricing analysis on all negotiated contracts. The result of DOD's cost and pricing analysis, in turn, provides the foreign country with greater confidence in the integrity of the cost versus those available through commercial sources.

In view of the negative impact such a situation has on commercial sources, the Investigative Staff believes DOD should comply with its own FMS policy guidance concerning the requirement for FMS customers to buy commercial-type items from commercial sources and not through the FMS program.

RESPONSE

The report observes that commercially available equipment is sold through Foreign Military Sales (FMS) arrangements, thereby reducing overall profit to U.S. manufacturers. While our basic policy is to have foreign countries buy commercial equipment direct, they are not restricted from pursuing FMS arrangement with clear justification and approval of the Defense Security Assistance Agency (DSAA).

As to the cited case, the U.S. Air Force processed the purchase of a commercially available helicopter through FMS at the request of the President of Venezuela and by direction and approval of the State Department and DSAA. We do not agree that the helicopter sale to Venezuela was based on the likelihood of obtaining the item about 10 percent cheaper than the normal commercial price. The sale was based on commercial catalog price with an additive cost of 3 percent for USAF administrative surcharge. In our opinion, no disadvantage to the commercial contractor occurred.

Small Business Administration (SBA)
Forms a Barrier to Economical
Procurement Practices

The provisions of the Small Business Act (the Act), PL 85-536, as amended by PL 95-507, were adopted to provide the means to develop competition and reduce procurement costs by developing new industrial sources through contracting with small and minority business firms for goods and services. However, the implementation procedures of the Act have become so cumbersome that the effect

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seems contrary to the basic intent of the Act, and have, in fact, caused problems in the accomplishment of effective and economic procurement practices. Specifically, the Investigative Staff has noted instances where costs have increased, competition has been diluted, and long leadtime procurement procedures have delayed the delivery of needed goods and services, due to the Act's implementation by the SBA.

The SBA implements the Congressional policy as set forth in the Act--that a fair proportion of Government procurements be placed with small and minority business firms. The SBA is empowered by the Act to (1) make a more detailed definition of a small business concern, (2) determine the small business status of individual concerns, (3) make a determination with procurement officials as to which procurements should be set aside for small business firms, (4) certify to Federal procurement officials that particular small business firms are responsible, and (5) enter into contracts for the United States and to arrange for performance of those contracts through subcontracts with small business concerns.

The Act requires that each negotiated contract exceeding $500,000 ($1 million for construction of public facilities) and which offers subcontracting possibilities should have a plan that insures participation by small business firms. Failure to submit a plan prior to contract award normally makes the bidder ineligible for the contract award. The Act also provides that each contract for goods or services with an anticipated value of less than $10,000 shall be reserved for small business firms unless competitive bids from two or more small business firms are unobtainable. These two areas are of major concern to DOD procurement officials due to the additional administrative workload being placed on contracting personnel as a result of additional regulations, paperwork, and management efforts.

Increased Contract Cost to DOD Results from SBA Requirement

The Investigative Staff has recently interviewed numerous DOD contract and procurement personnel at various levels. While most of those contacted agree with the spirit and intent of the Act, they feel that the requirements of the Act and the surveillance for compliance as conducted by the SBA are restrictive and lead to inefficient and uneconomical procurement actions. The administrative burden placed on the major defense contractors and DOD procurement officials to obtain certification of a contractor's small and minority business subcontracting plan is great.

Major contractors must hire additional personnel at a cost which is passed on to the Government, e.g.:

-- A major subcontractor added $30,000 as a direct cost for the preparation and administration of his small business plan.

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-- One DOD official estimated that the administrative cost associated with small business plans added at least 5 to 7 percent to each contract.

-- Another contractor adds a 3 to 5 percent surcharge to proposed material charges and, in addition, applies General and Administrative Expense (G&A) and profit to that increased figure.

The requirement to certify the contractor's small business plan for each contract also results in extended procurement lead-time with 60 to 90 days being the norm. The requirements of the law are interpreted differently from region to region, resulting in rejection of contractor plans, not because of content, but because of format. The stringent requirements of SBA have forced contractors to seek small business and minority firms to serve as "middlemen" in order to fulfill the letter of the Act. A bidder for one major contract was unable to find the necessary small business that could qualify in his contractual area. As a result, a minority accounting firm was hired to serve as a conduit for his invoices and billings. This was an unnecessary task which added nothing to the product but resulted in increased cost to both the Government and the contractor.

SBA Extends Procurement Pipeline

The Investigative Staff has surveyed the major DOD procurement commands, and the following represent some additional examples of how SBA, in implementing the Act, is actually a deterrent to sound procurement practices.

One episode involved a procurement request, dated June 18, 1980, with target award date of December 1, 1980, and first delivery date of November 1, 1981. SBA reserved the procurement for a small disadvantaged business. After extensive administrative, survey, negotiation, and contracting actions proved ineffective, SBA removed the procurement from its program. A contract with another firm not subject to the Act was issued on May 15, 1981, which will result in a 3-month delay in first delivery. It was also noted that the final contract was $800,000 less than the one negotiated with SBA's selected firm.

A second episode encountered by the same command involved a multipurchase contract whose requirements were determined in February 1980 and for which, to date, no contract has been signed.

In June 1977, the San Antonio Air Logistic Center (SA/ALC) awarded a requirements contract for survival radios to the Small Business Administration, providing for a unit price of $362.24. At the time of award, SA/ALC contracting personnel were aware that the designated subcontractor's eligibility for Section 8(a) (small business set-aside) awards was in question. They conducted negotiation directly with the subcontractor and noted that negotiations had to be completed before the subcontractor's 30-day

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appeal period expired. Contracting personnel finalized the award on the last day of the appeal period.

The subcontractor had initially qualified for awards under the 8(a) program by transferring company stock to an employee stock ownership plan. In negotiations for this contract, the company proposed to recover the cost of the stock by charging it as general and administrative expense on the contract, at a rate of 25 percent of direct labor cost. The proposed cost amounted to about $25 per radio. DCAA auditors noted that the cost appeared to have been recovered on previous contracts; however, the cost was disallowed in subsequent negotiations.

The Small Business Administration decided to cancel the firm's Section 8(a) eligibility because of questions about the legitimacy of the employee stock ownership plan. SBA officials noted that the company president was not a socially or economically disadvantaged individual, calling into question the control of the company. When an SBA auditor was sent to review records relating to the employee stock ownership plan in order to verify the company's minority ownership, the company president refused to provide records. Being unable to verify minority ownership, SBA cancelled the company's eligibility for Section 8(a) awards.

Some 2 years later, the SA/ALC awarded another requirements contract for survival radios under competitive circumstances using small business restricted advertising. The firm which had previously held the negotiated contract offered a price of $343.03 each, or about 6 percent less than had been negotiated some 2 years earlier. Had the 17,830 radios purchased under the previous contract been available at this competitive price, they would have cost about $340,000 less.

Certification of Competency (COC)

The SBA is required to certify the competency of a small business firm concerning all elements of responsibility, including capability, competency, credit capacity, integrity, perseverance, and tenacity. When SBA issues a Certificate of Competency (COC) to a small business firm, Government contracting officers must accept the certificate as conclusive of the prospective contractor's responsibility and capability. The Defense Acquisition Regulation (DAR) does provide administrative procedures that DOD contracting officers may use to challenge SBA's competency certificates, but these procedures are time-consuming and seldom used. Procurement officials are critical of SBA's ability to certify a small business, citing its lack of technical and engineering expertise to judge a firm's capability to perform.

Procurement officials emphasize that after COC's are issued and the procuring agencies' projected shortcomings become a reality, SBA does not accept any of the responsibility or liability for these delinquencies or their adverse impact on DOD's readiness. A major Inventory Control Point (ICP) cited the following examples:

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An SBA firm, which was already delinquent on six contracts, was low bidder on two additional contracts. The command recommended "no award," however, SBA chose to issue a COC in both cases which resulted in award of the contracts to the low bidder. The first contract required deliveries to commence on March 15, 1980. As of April 30, 1981, no items had been delivered. The second contract required delivery on April 15, 1980. Delivery is now scheduled for November 1981. This situation resulted in added leadtime, and it will require DOD to have more inventory on hand to meet readiness needs.

Procurement officials are concerned over their inability to terminate contracts with small business firms who have records of poor or nonperformance. One manager at a major procurement activity estimated that $1.7 million a day is lost due to extended leadtimes. He has also experienced small business firms delivering their products late 50 to 70 percent of the time. Additionally, on those procurements which are small business set-asides, DOD must accept the firm selected by SBA even though there might be a more qualified small business firm with a better performance record.

Conversely, DOD's contracting officials cited an example of a well-qualified minority contractor who developed his industrial capacity in cooperation with SBA. However, when the dollar amount of contracting with the firm increased to such an extent that it no longer qualified for small business set-asides, the firm had to withdraw from the program. Since this contract remained as a small business set-aside, a new contractor has to be developed, which will further extend procurement leadtime.

Investigative Staff Observations

The Investigative Staff supports the intent of the Act, as the development of new sources of materials and supplies can only enhance competition, reduce costs, and aid in rebuilding the eroding industrial base and sources of supplies. However, the present requirements of the SBA have only placed roadblocks in the way of sound procurement practices, resulting in increased costs, extended administrative leadtime, and ineffective procurement practices. These implementing procedures need to be streamlined in order to carry out the intent of the law and also allow Government procurement officials to process their contracts in a timely manner.

It appears that the SBA is more concerned with increasing the numbers of small and minority firms participating in the program than the full development of qualified contractors and assuring that adequate consideration is given to meeting DOD's procurement needs in a timely manner.

RESPONSE

The report suggests that implementation of the Small Business Act provisions reduces competition, increases costs, and lengthens

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procurement leadtime. There are some aspects of the legislative requirements that are administratively costly and burdensome. Of particular concern are the provisions of Section 8(a) for awards to the Small Business Administration, the preparation of subcontract plans in large contracts, and the certificate of competency process. While we strongly support contracting with small business firms as being in the national interest, we believe procedures could be streamlined. For example, we have under active consideration a revision to our regulation that would provide for annual subcontracting plans in lieu of contract-by-contract plans, as major contractors are now required to prepare.

The Service Contract Act is Resulting in Higher Procurement Costs

The Service Contract Act (SCA) forces DOD to pay higher labor rates than are necessary in the performance of service contracts and also forces contractors doing business in lower cost-of-living areas to pay higher wages and fringe benefits than those prevailing in the contractors' area.

The SCA of 1965 (McNamara-O'Hara) provides wage, fringe benefit, and other lesser protections to service employees performing duties under a Government contract. The Act was intended to provide protection for nonprofessional/nontechnical workers (blue collar) in the service industries. Under the SCA, contracts of $2,500 or less are subject to minimum wage standards specified in the Fair Labor Standards Act, and contracts in excess of $2,500 are subject to wage determinations (wages and fringe benefits) issued by the Department of Labor (DOL). The SCA designated the DOL as the responsible party for administration of the Act.

DOL wage determinations are based on current and previous labor agreements, prevailing Federal wage rates, and wage averages based on Bureau of Labor Statistics (BLS) surveys. Often, the DOL-developed wage rates are higher than the average wage rate paid in areas where the contract is to be performed. This can result in a contractor employing a dual system of bookkeeping, one for the Government work and one for his commercial work. Once a wage rate is established for one geographic area, this wage rate is applicable to other areas where this same Government work is performed, regardless of the prevailing wage rates in the new areas.

DOL is attempting to extend the influence of the SCA to overhaul and maintenance contracts (subject to the Walsh-Healey Public Contract Act). If this occurs, several contractors have stated that they will not accept SCA provisions and cease to contract with the Government, as the DOL wage determinations would be in excess of the rates being paid by the contractor. Additionally, according to U.S. Navy estimates, contract costs for professional services could increase by 10 percent annually.

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SCA Places Increased Cost Burdens on Both DOD and Contractors

One senior DOD contracting official advised that he was unable to effect a contract with a small business because, under the SCA, the contractor would have to pay his employees more for Government work than for his commercial work. He was unwilling to go through the burdensome accounting process to segregate costs. It would have cost the Government $.75 per man-hour less if the commercial rate was used.

In a recent negotiated procurement, a prime contractor refused to enter into a proposed contract which contained provisions of the SCA. The contractor's primary industry is the manufacture of helicopters, to which services are incidental. If the SCA provisions were accepted and enforced, the company would have had to pay the prevailing area wage, which for services was less than the union wage specified in its employees' contracts. In addition, the fringe benefits to be paid were required to be the same amount as the benefits paid to corporate headquarters employees. These benefits exceeded the amount of benefits contained in the union agreement at the place of the performance.

Investigative Staff Observations

Certain wage provisions of the SCA, as they are presently being implemented, appear to be adding unnecessarily to the cost of Government contracting. DOD should identify those provisions which are counterproductive and not cost-effective so that steps can be taken to have these provisions revised.

RESPONSE

We agree with the comments that implementation of the Act places increased cost burdens on DOD and contractors. DOD previously accomplished the identification of counterproductive provisions and submitted a legislative package of amendments for OMB approval in February 1981. However, the Administration has taken the position that regulatory rather than legislative revisions are appropriate. DOL has proposed extensive regulatory changes and is now reviewing public comments prior to final publications. The proposed regulatory changes will resolve the problems of major concern.

DOD's Failure to Purchase Necessary Technical Data has Hindered Competitive Procurement

The expense of procuring technical data from contractors, plus the reluctance of the procurement officer to initiate such action, has deterred DOD's component breakout program and hindered competitive procurement.

Technical data are the means used for the communication of concepts, plans, descriptions, requirements, and instructions relating to technical projects, materials, systems, and services.

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The data may include specifications, standards, engineering drawings, manuals, and reports. Data may be required for program definition, technical monitoring, design and development, test and evaluation, configuration management, prototype manufacturing, procurement, production, processing, cataloging, standardization, training, operations maintenance, repair, and emergency remanufacturing.

It is DOD policy to encourage inventions and to provide incentives by respecting technical data development by private concerns. The procuring activity is responsible for initiating a purchase request, after careful consideration within the procurement activity, to determine the use for each data package and to purchase only that data which is an absolute requirement. The Government's right to data is set forth in the original contract. It is either limited, for use by the Government only, or unlimited, which can be used by the Government in any manner or for any purpose. The purchase of unlimited data gives DOD the right to "breakout" components from major end items for competitive bidding. However, if the contractor refuses to give up his proprietary interests or his price is too high, the future procurement of an end item or tools, information, or processes used in the production of the end item become source controlled, that is, they may only be purchased on a sole-source basis.

DOD procurement and technical people differ on the importance of technical data. An official at one major Inventory Control Point (ICP) expressed concern over its inability to break sole-source procurement of spare parts because of the lack of technical data on subassemblies and component parts for avionics systems. Another ICP conducted a study and found that on spare parts with complete data packages, 5,070 were already available in the DOD supply system. An analysis of a major aviation weapon system now in production has already identified 146 spare parts which could have been broken out at an estimated cost savings of over a million dollars.

Not all DOD officials concur with the idea that given a manufacturing data package, almost any item can be procured competitively. They feel that this is an extreme oversimplification, especially when applied to complex systems and subsystems. The technical data packages are normally developed by the original manufacturer and often require patented or proprietary processes not known by or available to competitors. In other cases, references to company-provided specifications, that were not part of the technical data package, limit or prevent the manufacture of the item by other firms. It is difficult and costly to maintain data in a reliable up-to-date configuration, especially when a weapons system undergoes major modifications in the process.

Many manufacturers are reluctant to sell technical data to DOD as it would result in their losing their sole-source status and, in turn, would force them into a competitive situation. Some have set a high price on their data. One major firm priced

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their data on an $800,000 item at a million dollars. When a contractor controls the data, he controls the price, resulting in increased procurement costs for DOD. The sole-source supplier will normally price the data at a cost level equal to or greater than the projected profits from sales of the item to the Government. If the savings are present for the Government to justify unlimited data rights acquisition for a single spare part item, the contractor will normally set his price above the "break even" point.

Lack of Funding for Technical Data Slows Component Breakout

The greatest barrier to the procurement of technical data is the failure to budget for its purchase and maintenance. One major ICP has a budget of $7,500 for technical data acquisition and administrative costs for the reproduction of data or drawings. Low budget figures and high purchase costs deter some program managers from purchasing data even though future procurement costs could well justify its acquisition.

Investigative Staff Observations

While the procurement of technical data is vital to a successful breakout program, decisions to purchase such data should be made on a case-by-case basis, with full consideration given to such factors as known reliability of the data, proprietary interests, anticipated requirements, availability of alternate sources, stability of designs, and cost savings and effectiveness. Funding provided should be sufficient to enable the proper purchase of this data. When a contractor controls the data, unreasonable profits can result with increased cost to the Government. This area should be intensively managed to improve the competitive situation. One of the major factors in identifying and controlling sole-source technical data monopolies is the determination of the reasonableness of price charged to the Government. Communication within DOD of the existence of unreasonable pricing practices based upon the ownership of technical data may help to preclude future contracting with those identifiable firms.

RESPONSE

The report notes that the expense of procuring technical data, among other matters, inhibits DOD's ability to break out components for competitive procurement. It is our policy to break out components for competitive procurement if savings can be expected and the quality and reliability of the item can be reasonably assured. Purchase of the technical data requires funding and the in-house capability to review the data and maintain it. We agree with the report's conclusion that decisions to purchase technical data should be made on a case-by-case basis with full consideration given to the reliability of the data, proprietary interests, anticipated requirements, availability of alternate sources, stability of designs, and cost savings. Currently, we are actively engaged in updating our spare parts breakout program to enhance competition.

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The Leader/Follower Procurement Technique Can Provide Major Benefits But Is Used Sparingly By DOD

The leader/follower company procurement is a technique under which the developer or sole producer of an item or system (the leader company) furnishes manufacturing assistance and know-how to enable a follower company to become a source of supply for the item or system. The technique is used to accomplish the following DOD objectives:

-- Shorten the time of delivery.

-- Establish additional sources of supply and obtain geographical dispersion of supply sources.

-- Make maximum use of scarce tooling or special equipment.

-- Achieve economy of production.

-- Eliminate problems in the use of proprietary data.

-- Effect transition from development to production and to subsequent competitive production of end items or major components.

The procedures to implement this program are outlined in the Defense Acquisition Regulation (DAR) as follows:

-- Award a prime contract to an established source (leader company) which is obligated to subcontract a designated portion of the total number of end items required to a specified subcontractor (follower company) and to assist the follower company in that production.

-- Another procedure is to award a prime contract to the leader company for the requisite assistance to the follower company, and another prime contract to the follower company for production of the items.

-- Finally, the award of a prime contract for the items can be made to a follower company who is obligated to subcontract with a designated leader company for the requisite assistance.

The Army's Missile Command (MICOM) has used this technique very effectively on a few occasions and, in addition to the benefits outlined above, achieved estimated savings exceeding $171 million in the procurement of three weapons systems, as shown below.

TOW Missile System

The TOW is a heavy assault weapon designed primarily to destroy enemy tanks, pillboxes, or armored vehicles. The missile

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is tube launched, optically tracked, and wire guided. The TOW missile may be launched from a tripod, from vehicles, and in the airborne mode it may be launched from a helicopter.

The system is composed of the missile, launcher, and ancillary equipment. The three major components of the launcher are the optical sight, the traversing unit, and the missile guidance set. Ancillary equipment includes a battery charger, vehicle mounting kits, and training equipment.

The first production contract for the TOW missile system was awarded to Hughes Aircraft, the system developer. This was a fixed price incentive contract (FPIC) with incentives on cost, delivery (negative only), and performance. Under this contract, TOW missiles, TOW launchers, and ancillary equipment were procured.

The second source contractor for the TOW missile system was selected based on competition. Chrysler Corporation was selected as the second source contractor. Chrysler was awarded a firm fixed price contract for an "educational buy" of missiles with options for additional quantities. In a later procurement action, Hughes Aircraft and Chrysler were each awarded contracts as the result of a split competition. Hughes, as the winning contractor, received the larger quantity. (NOTE: An "educational buy" is a procurement method used to allow a new company to manufacture a few items and refine his process so that larger procurements can be accommodated at a future date.)

As a result of developing a second source and introducing competition into the production phase of the TOW missile system, audit verified savings of at least $44.8 million were realized.

DRAGON Missile System

The DRAGON is an antitank command-to-line-of-sight guided missile system. Fired by one man from a recoilless launcher, the missile is tracked optically and is guided automatically to the target by electrical impulses transmitted via a wire command link. The weapon consists of two major components--a round and a tracker.

The round consists of the launcher and the missile. The launcher serves the dual purpose of being the handling and carrying container for the missile. The DRAGON tracker consists of the optical sight, the firing mechanism, an infrared sensor, and a control signals comparator. Ancillary equipment for the DRAGON system includes training equipment and a test set.

A contract was initially awarded to the system developer, McDonnell Douglas Astronautics Corporation, to conduct a Production Engineering Program, with subsequent production and delivery of system hardware, ancillary equipment, and engineering services to support the DRAGON system.

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A second source was authorized on both the round and the tracker, to develop a competitive position on each through the use of educational production contracts. The contract was awarded to Raytheon Company for a small educational quantity with options for additional quantities. Later another contract was awarded to Kollsman Instrument Company, again for a small educational quantity with full production options.

Subsequently, the DRAGON round and tracker were authorized for a partial competition phase. Dual awards could be made on a 60/40 or 50/50 percent split for the total requirements. Awards were made on the basis of the lowest evaluated price to the Government. McDonnell Douglas won both aspects of the partial competition over Raytheon and Kollsman. The follow-on options were exercised on both the winning and losing contracts. This resulted in McDonnell Douglas having two 60 percent production awards for the rounds and two 60 percent awards for the trackers. The losers in this phase (Raytheon and Kollsman) each received two 40 percent production awards--each for the original contract and the option on their respective items.

The final contracts on a winner-take-all basis were awarded to Raytheon for the round and Kollsman for the tracker.

Savings estimates generated by the use of this leader/follower technique ranged up to $90 million.

SHILLELAGH Missile System

The SHILLELAGH Missile System is a direct fire, boost glide, line-of-sight missile system. Missile tracking and command guidance is accomplished using infrared links between the missile and vehicle mounted guidance and control system. The breech-loaded, tank-mounted 152mm gun tube is used for launching the missile. The missile is loaded, aimed, and fired in the same manner as conventional ammunition except that sighting with the SHILLELAGH guidance system does not require an estimate of target lead or gun elevation based on range, target velocity, or windage.

The first SHILLELAGH production contract was awarded to the system developer Philco-Ford Aeronautics Company, Newport Beach, California. During a 3-year period, Philco-Ford was awarded three sole-source contracts to deliver 35,158 missiles.

During this period, Martin-Marietta of Orlando, Florida, was being developed as a second source for the SHILLELAGH system. Martin-Marietta was given two contracts to produce 12,480 missiles.

Finally, Philco-Ford was awarded a competitive firm fixed price "buy out" contract to deliver 52,700 missiles. Thus, by employment the leader/follower acquisition technique to introduce competition into the production phase of the SHILLELAGH missile acquisition, audited savings estimated at $36.4 million were realized.

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Investigative Staff Observations

The Investigative Staff believes DOD has only "scratched the surface" in exploiting the potential benefits to be derived from the use of the leader/follower concept. Admittedly, the use of this technique requires more work by the contracting officers and implementation takes more time. However, the Investigative Staff believes that the potential benefits of the leader/follower technique are enormous and DOD contracting officers should be strongly encouraged to use them.

RESPONSE

We agree that the leader/follower technique is useful in competing major weapons systems. It is our intent to enhance utilization of this technique whenever it is practicable and cost effective.

Other procurement techniques we are stressing to effect competition for major systems include:

-- Dual or second sourcing. A second contractor is established for the purpose of achieving parallel production capability for future competition.

-- Joint teaming. A team of two or more firms is awarded a development contract with the effort to be split among the firms that, in the future, will compete independently for production of the weapons system.

-- Competitive parallel development. Two or more firms develop and validate separate competing systems to meet a specific need, usually resulting in a prototype demonstration or fly-off between the competitors.

-- Directed subcontracting. The prime contractor is required to develop a second source for a particular component through competitive subcontracting.

Pursuit of the Component Breakout Program Could Save DOD Many Millions of Dollars

The failure of the services to identify component breakout opportunities for the provisioning of spares for major weapon systems is costing DOD millions of dollars in excess procurement costs.

Component breakout occurs when a component, used in the manufacturing or modification of an end item which was provided initially under the prime contract, is purchased subsequently by the Government either through competitive bidding or direct purchase from the component manufacturer. This eliminates the add-on costs by the prime contractor or intermediate subcontractor if they had arranged the procurement of the component. One major

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contractor charged DOD 630 percent more for spare parts than it would have cost if these spares had been procured directly from the component manufacturer.

It is DOD policy to breakout components whenever substantial net cost savings can be achieved and the breakout does not jeopardize the quality, reliability, performance, or timely delivery of the end item. Additionally, when analysis reveals conditions currently unfavorable to breakout, actions are supposed to be taken to determine the feasibility of eliminating those conditions. DOD's policy also requires the earliest possible identification and screening of components to determine whether the best procurement method is to purchase from the prime contractor or to breakout the item for competition or direct purchase. The screening for breakout should occur as an adjunct to initial provisioning to the maximum extent possible. This screening process should be accelerated so that decisions can be made sufficiently in advance of the first procurement for replenishments to insure use of the best procurement method.

The weapon system program manager is responsible for the component breakout selection, review, and decision process and for preparing the records justifying his decisions. A recent Air Force audit of nine major weapon systems found the breakout policy was not effectively applied to six weapons sytems because the program managers failed to aggressively pursue the component breakout program. Furthermore, they lacked guidelines for preparing cost analysis to support their decisions for not breaking out components. The audit identified approximately $56.7 million in savings that could have resulted from an aggressive breakout policy. On the other hand, the auditors noted three programs where the use of aggressive breakout programs is resulting in estimated savings between $110 and $130 million.

Other Examples Where Component Breakouts Can Increase Savings

The Marine Corps has been able to breakout components of the sight assembly on the LVT-7 vehicle. The following examples demonstrate the cost effectiveness of component breakout.

Item	Old Cost	Breakout Cost	Percent of Savings to Government
Band	$ 6.00	$ .14	98
Prism	129.50	36.80	72
Window	56.81	34.50	39

At one Navy ICP the Naval Audit Service estimated that at least 3,000 items annually could be broken out resulting in an annual savings of more than $8 million.

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Reasons Why Program Managers
Do Not Pursue the Breakout Program

Program managers' reluctance to pursue breakout policies are based on their belief that component breakout will (1) increase workload without an increase in manpower, (2) cause contractor-furnished equipment and Government-furnished equipment integration problems, (3) cause configuration management difficulties, and (4) increase procurement administrative leadtime. These problems are minimal in comparison to the potential cost savings.

There is also concern from some contractors over DOD's breakout policies. For example, one major aviation contractor is concerned that, "breakout is now being used in a manner which threatens the integrity and safety of all man-carrying aircraft." The contractor was concerned over certain component breakouts which he felt impaired the operation of his manufactured aircraft. The Investigative Staff determined, however, that the item which caused the contractor's concern was selected for competitive procurement and that the contractor did not even submit a bid.

Contractor Pyramiding of Procurement Dollars
for Excess Profits Could be Eliminated by an
Aggressive Breakout Policy

An Air Force review conducted at a major aviation contractor revealed substantial "pyramiding" of procurement prices for spares procured through the prime contractor that resulted in a 630 percent increase in costs to the Government. While the review covered only 146 spare parts from one vendor, it showed an immediate potential savings of $1.2 million, if these items were purchased directly from the spare parts supplier. The review also identified unnecessary payments to this contractor of over $4 million on past procurements due to DOD's failure to contract directly with the component manufacturer.

In the case cited above, DOD was paying the prime contractor significant amounts for spare parts which he, in turn, had purchased from other vendors. Substantial savings to the Government are available by using the component breakout program. Neither DOD's provisioning policy nor the contractors' procurement systems operate to take full advantage of these savings. The parties involved in the "pyramiding" procurement system had the following relationships:

ICP	(initiated procurement action for spares)
Prime Contractor	(produced major weapon system)
Subcontractor A	(provided component)
Subcontractor B	(handled spares for component)
Vendor	(manufactured spares)

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This pyramiding system resulted in significant price increases as the following partial list indicates:

Spare Part	Prime Contractor Cost to DOD	Spare Parts Supplier's Actual Price	Percent of Cost Increase Over Supplier Cost
A	$199,405	$9,770	1941
B	26,765	3,950	578
C	22,522	4,300	424
D	16,954	2,400	606
E	15,197	2,350	547
F	10,719	1,600	570
G	10,114	1,700	495
H	9,563	1,600	498
I	4,821	120	302
J	3,157	525	501

Future procurements can benefit from the use of the component breakout program with a savings impact in the hundreds of millions of dollars as the following example involving only one major weapon system indicates.

Prime Source	Proposed Price	Supplier's Price	Savings
A	$37,063,890	$13,004,874	$24,059,016
B	15,958,592	2,407,027	13,551,565

Investigative Staff Observations

The Investigative Staff believes that the full implementation of an aggressive component breakout program will greatly enhance competition and concurrently reduce procurement costs. These substantial savings can be realized through strict adherence to DOD's component breakout policies.

RESPONSE

The report observes that increased component breakout will achieve savings. It is our policy to breakout components for competitive procurement where it is cost effective and the quality of the item can be assured. We also have a program called the "Hi Dollar Spare Parts Breakout Program" to breakout spare parts from the weapon systems manufacturer for competitive procurement or direct procurement from the actual manufacturer. We are emphasizing breakout. Currently, the spare parts breakout regulation is being revised to provide additional emphasis to breakout for competition.

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There are millions of purchases from vendor and low tier suppliers each year. The prime contractor and his subcontractors are legally and properly permitted to be reimbursed and receive a profit on their efforts in administering such transactions. Granted the example given, if correct, is inordinate. We will look into the specifics regarding the contractor and the item you reference and take whatever action may be appropriate.

Our strategy in regard to our complex weapon systems is to contract the system management, system engineering, integration, and test to a prime contractor and hold him responsible for the efficacy of the entire system. This is a sound and proven approach but, of necessity, gives him the bulk of the buying on the system. Once the system has been successfully integrated, however, we can and do instigate more fully our "break out" policy of buying direct from the vendors, furnishing such items as GFE (Government Furnished Equipment) and avoiding much of the added administrative cost. These breakout actions are, of course, time-consuming to our Defense contract administrative and technical supporting staff elements so that discretion must be used in pursuing the breakout actions that have a high cost benefit.

The overview and summary volume of the report cited an instance where a part purchased by DOD from a prime contractor at a cost of $199,405 had been obtained by this prime from a subcontractor at a cost of only $9,770. The information cited was provided by an Air Force Plant Representative Office as an example of a purchasing system and estimating system deficiency. In the final pricing of parts, the contractor involved had failed to provide current, accurate, and complete cost and pricing data. The Government recouped $189,623 from the contractor and generated a revised purchasing, estimating, and proposal system. Here the Government exercised its management controls and made the system work.

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Report of September 23, 1981

NONCOMPETITIVE PROCUREMENT, THE RULE RATHER THAN THE EXCEPTION

The Committee expressed concern about sole-source and noncompetitive contract awards made by elements of DOD. Numerous instances of erroneous or improper procurement method coding, inadequate or nonexistent technical specification data, and restrictive procurement specifications show these practices exist and do indeed result in higher prices.

Erroneous or Improper Procurement Coding

The Air Force San Antonio Air Logistics Center (SA/ALC) paid nearly $1,700 for an aircraft boarding ladder that should have cost less than $600 (see sketch on next page).

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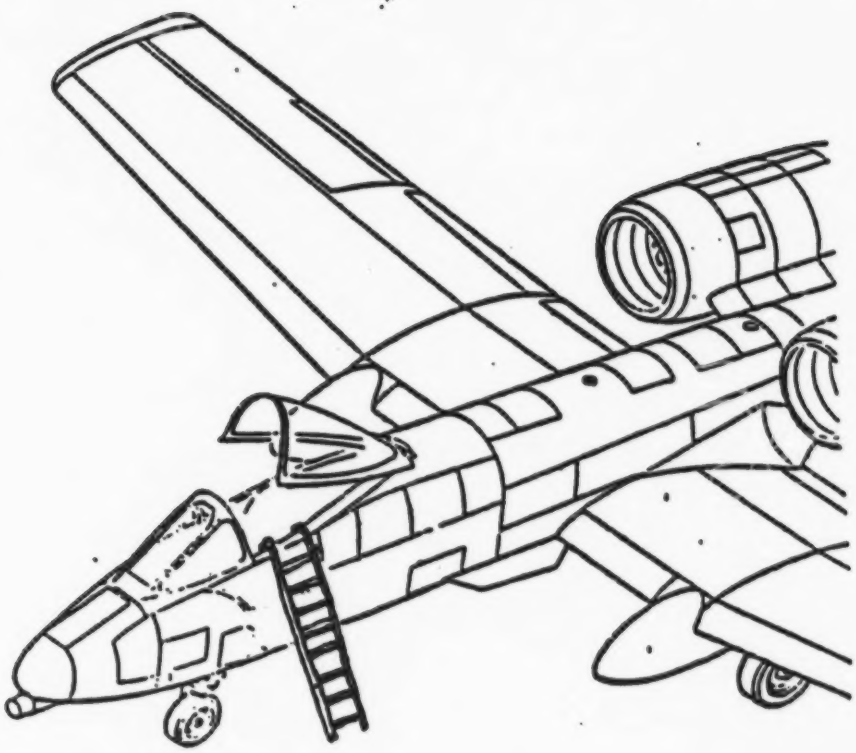
Contractor Fairchild Republic Company
Contract No. F33657-75-C-0.00
Document No. CSTG0W0001
End Item Ident. A-10 A
Fig. 1 Page No. 179.1
Revision No. Original
Date 28 Feb 1975



Simplified Sketch of the A-10 Boarding Ladder

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The A-10 aircraft boarding ladder was developed by the Fairchild Republic Company to make it more convenient for maintenance personnel to climb in and out of the aircraft cockpit. It is made of welded tublar aluminum, is 9 to 10 feet long, and is fashioned with hooks which extend over the side of the aircraft into the cockpit.

SA/ALC has twice purchased the A-10 ladders sole-source from Fairchild because SA/ALC personnel erroneously believed the Government did not have engineering data considered necessary to purchase from other sources. Screening to determine method of procurement had resulted in assignment of code "3D" which indicates that the item must be bought from the original manufacturer because needed data "can not be obtained." Contract file documentation even indicated that the contractor had previously refused to sell data to the Government. Documentation notwithstanding, the Investigative Staff learned that the Government has A-10 ladder engineering data which is apparently suitable for reprocurement. Following the Investigative Staff inquiry about the ladder, an SA/ALC engineer contacted the Aeronautical Systems Division and learned that data with unlimited rights was purchased in 1975. This data has been available for several years but was apparently not sent to SA/ALC, the organization responsible for ladder reprocurement.

The most recent sole-source procurement was in August 1980 when SA/ALC ordered 71 A-10 ladders from Fairchild at a unit price of $1,676 and total cost of $118,996. This price was negotiated after a Defense Contract Audit Agency and Defense Contract Administration Services review of contractor cost data.

F-105 boarding ladders are physically very similar to the A-10 ladders but cost less than $600 each. SA/ALC has engineering data for the F-105 ladders and uses it for competitive procurements. The most recent procurement was in May 1980 when SA/ALC awarded a small business set-aside contract for 17 ladders at $586.34 each.

At the request of the Investigative Staff, SA/ALC engineering personnel physically examined and compared the A-10 and F-105 boarding ladders. They concluded that there was very little difference in the ladders and that manufacturing costs (labor and material) should be about the same.

Based on the above, the Investigative Staff concluded that A-10 ladders cost almost three times more than they should and that SA/ALC's procedures for negotiating fair and reasonable prices did not produce a price comparable to that obtainable through competition. Competitive procurement on the 71 A-10 ladders might have saved as much as $75,000. Further, the fact that data was available to permit competitive buys suggests that SA/ALC screening procedures for determining procurement method (competitive or sole-source) are not fully effective.

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Inadequate or Nonexistent
Technical Specification Data

Lack of technical data needed to solicit additional procurement sources for spare and repair parts reduces the potential for decreasing the very high percentage of noncompetitive procurements.

The Naval Air Systems Command (NAVAIR) procures Navy aircraft and their engines as well as major aeronautical equipment. The command also procures the technical data packages needed for logistics and maintenance support of the weapons and their related equipment. The Aviation Supply Office (ASO) is the Navy's inventory control point for aeronautical repair and spare parts for the NAVAIR procured items. Its responsibilities include the procurement and management of about 273,000 parts. During FY 1980, ASO procurements amounted to $1.2 billion, and only about 11 percent of the amount was awarded based on competition. The percentage of competitive procurements has been about the same during the last several years.

The absence of adequate data occurs because the Navy (1) does not procure sufficient data from contractors at the time that weapons and related systems are procured, (2) fails to identify deficiencies in available or procured data at the time that repair and spare parts are initially provisioned in the supply system, and (3) does not screen or makes only a limited screening of most parts to determine the adequacy of data prior to follow-on replenishment procurements.

The major effort by ASO to identify opportunities for competitive procurement is its implementation of DOD's High Dollar Spare Parts Breakout Program. The objectives of the program are to identify parts which can be procured competitively, or if this is not possible, to identify parts which can be procured directly from the manufacturer rather than through a prime contractor.

The first opportunity to screen items to determine the most suitable procurement method is at the time they are initially provisioned in the supply system. The DOD program does not encourage screening items at this time to determine the most suitable procurement method. The DOD regulation governing the program states that if screening does occur, it should emphasize identifying items for direct purchase from manufacturers. Little emphasis is placed on determining whether technical data is available to permit competitive procurement. Consequently, the concept of sole source procurement is established at the time items are purchased for initial provisioning, which makes competitive breakout more difficult at a later time when replenishment requirements are generated.

The DOD breakout program places the greatest emphasis on parts with relatively high dollar procurement values. At ASO, these are parts with an anticipated annual buy value of $25,000 or more.

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Such items undergo a "full screening." This involves data, technical, and economic evaluations. Attempts to complete a technical data package to make it suitable for competitive procurements are limited to items with a reasonable expectation of competitive breakout after the technical and economic evaluations are completed.

The DOD breakout program also provides for performing limited screening of items with relatively low procurement value. At ASO, this includes items with an anticipated annual procurement value of between $6,000 and $25,000. Items with anticipated annual buy values less than $6,000 are not screened. Limited screening is designed to only identify parts which can immediately be cleared for breakout and concerns only the prime points of data, technical, and economic evaluation. Screening efforts cease if any obstacle is encountered. At ASO, limited screening efforts are constrained by what can be accomplished over a consecutive 21 calendar day period.

Based on the results of both full and limited screening efforts, a procurement method code is assigned to each item. During the 6 1/2-year period ending March 31, 1981, ASO screened 158,645 items prior to replenishment procurements of which only 29,132, or 18.4 percent, were given full screening. At the end of the period, procurement method codes were assigned to 124,073 of the 273,063 items managed by ASO, or about 45 percent.

Of the items assigned a code, only 15,069, or 12 percent, were coded as suitable for competitive procurement. ASO claimed savings of about $4.2 million for items initially broken out for competitive procurement. Of the remaining 109,004 coded items, the principal reason for the codes assigned to 68,286 of these items, or about 63 percent, was that the Government does not have in its possession sufficient, accurate, or legible data to purchase the item from other sources.

ASO officials conceded that lack of data was one of the problems that restrict the inventory control point's ability to introduce competition into the procurement of more parts. They cited the lack of data on subassemblies and component parts of complex avionics systems procured by NAVAIR to performance specifications, and the generation of requirements prior to the receipt of data packages contracted for by NAVIAR. They also indicated that breakout efforts would be enhanced if NAVAIR received additional funds to procure more data packages for component parts.

At the Army's Troop Support and Aviation Material Readiness Command (TSARCOM) and at the Aviation Research and Development Command (AVRADCOM), the primary emphasis for avoiding single source procurement and for fostering competitive procurement is the breakout program. Both TSARCOM and AVRADCOM have breakout programs although the TSARCOM program is much more intensive and structured. Breakout effort is more difficult in the research and development environment.

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When the responsibility for the breakout function is passed on to the project office or the prime contractor as is the case of weapons systems parts, there can be a conflict of interest because the project manager's prime concern is fielding a weapon system that is within the functional, time and funding constraints established for the program. Breaking out parts and components to competitive suppliers could add risk to fielding a functional system within the time constraints. In addition, prime contractors do not generally support breakout programs because of their own financial interests.

An example of this involves a contract for $52,950 to obtain a technical data package for a helicopter crew seat. In September 1980, AVRADCOM awarded a negotiated contract to ARA Incorporated for technical data and manuals to be used in developing a competitive procurement package for Blackhawk helicopter armored crew seats. It was hoped that a qualified seat could be ready in time to be provided as government furnished equipment (GFE) for the pending procurement of Blackhawk helicopters. ARA previously developed a seat that they were attempting to have qualified, however, it was not qualified in time to be used as GFE and had not been qualified at the time of our review. Apparently the prime contractor prefers a different seat and the project manager was concerned with delays that might occur if a new seat is furnished as GFE.

The lack of an intensive independent breakout effort at AVRADCOM may be costing that command savings that could accrue through competitive, and/or direct procurement from the manufacturer. There is potential for great savings in the procurement of new parts, components and subsystems, ground support equipment, etc. If parts are designed with breakout and competitive procurement in mind it is much easier to establish additional sources of supplies and to bring about a full and open competitive atmosphere that leads to lower prices.

Design modifications have also resulted in noncompetitive contract awards. For example, since 1974, the San Antonio Air Logistics Command (SA/ALC) has acquired about 30,000 AN/URT 33C beacon radios. These radios are a part of the survival gear on several aircraft systems that emit a homing signal to facilitate location of downed airmen.

In early 1979 ACR Electronics, Inc., successful bidder on several previous competitive awarded contracts, proposed design changes to the radio. The primary change involved replacing a Cutler Hammer switch with a magnetic switch made by ACR.

Initially, the price increase resulting from the design change was modest. On two ACR contracts in various stages of completion, SA/ALC negotiated new unit prices of about $129 per unit, an approximate $10 increase. On the next purchase, however, the price increased sharply. On July 26, 1979, SA/ALC issued ARC another sole-source unpriced order for 5,501 radios. Subsequent negotiations produced a unit price of $161.50, an increase of $32.50 (25

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percent) over the $129 price discussed above. SA/ALC's justification for the $888,411 sole-source procurement was based on "emergency" needs.

In August 1979, SA/ALC contracted with ACR to provide engineering data for the new design at a cost of $32,000. Delivery of the data was scheduled for December 1979, but ACR did not deliver it until sometime after March 14, 1980. Before the data was received and made ready for use in competitive procurement, SA/ALC made two more sole-source radio purchases from ACR. SA/ALC ordered 68 radios at $166.50 each in March 1980 and 2,934 radios at $150 each in July 1980. The total cost of these two orders was $451,422.

A similar situation occurred with the cable assembly used with these beacon radios. The assembly activates the radio when the ejection seat separates from the aircraft. The assembly consists of a plunger switch which activates the radio, a rocker switch for selecting automatic or manual operation, a plug which connects to the radio, and connecting cabling. Since 1976, SA/ALC has awarded 12 contracts for 11,509 cable assemblies at a cost of $1,351,842.

SA/ALC acquired engineering data that permitted competitive procurements of the cable assemblies around 1976 or 1977. In December 1977 and in April 1978 the same contractor, ACR, was competitively awarded two contracts. Based on ACR's bid prices of $63 and $64, the cost of the two contracts was expected to be $25,604. Before any cables were delivered, however, ACR submitted an engineering change proposal to improve the cable design and reduce the failure rate. SA/ALC accepted the proposal and negotiated a new unit price of $125.56 with ACR. Total cost of the two contracts increased to $50,726.12.

As a result of the design changes, SA/ALC's reprocurement data package for the cables became incomplete. In May 1978, SA/ALC contemplated buying engineering data for the new design but would not agree to the contractor's proposed price of $15,000. Based on the low usage rate for cables at that time, SA/ALC personnel believed it would not be cost effective to pay $15,000 for the data to permit competitive procurements.

The usage rate for cables was rather low at that time. In the year period prior to May 1978, SA/ALC had contracted for only 628 cables. After that time, however, cable purchases began to increase. Since May 1978, SA/ALC has bought 10,881 cables at a cost of $1,286,668. These were purchased on nine separate orders, all of which were sole source to ACR because reprocurement data was not available.

It was not until the most recent order (awarded in April 1981) that SA/ALC again attempted to buy reprocurement data for the cables. ACR refused to sell, and SA/ALC is currently evaluating various options for reestablishing competition in cable assembly procurement. One such option is to competitively award a contract

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for development and engineering data for a totally new cable assembly. Another option is to begin buying the old cable designed by Pourdee.

The SA/ALC's May 1978 decision to not buy the engineering data may have been justified at that time. However, the volume of purchases since that time should have caused that decision to be reevaluated long before 1981. Only after expenditures of $1.3 million on nine sole-source orders is SA/ALC evaluating options for obtaining competition. It also would seem prudent for SA/ALC to be more alert for modification or design changes leading to sole-source and possible increased cost situations, as described above.

Restrictive Procurement Specifications

Procurement specifications for several contracts reviewed did not provide for full and open competition. Neither TSARCOM nor AVRADCOM assured full and free competition in their procurements. Solicitations contained restrictive specifications or in some cases advertised solicitations were restricted to approved sources. For example:

A contract was awarded by TSARCOM to White Engines, Incorporated, for 15 six-cylinder diesel engines to be used in a trailer mounted shop set that is managed by the Army's Ammunition and Armament Command at Rock Island, Illinois. The cost of the 15 engines was $87,615. The solicitation was issued citing only White's model number for the engine. Although four other potential suppliers requested information about the procurement, TSARCOM negotiated only with White Engines. The negotiation was justified on the basis of 10 USC 2304(a) 10, i.e., "it is impractical to obtain competition, fully adequate data and quality assurance procedures are not available and cannot be made available to satisfy the requirement." The contracting officer stated that use of formal advertising was impracticable because the data available are not adequate to assure that the part or component will perform the same function in the equipment as the component to be replaced. TSARCOM officials advised us that the Ammunition and Armament Command is the only Army user and they directed that the engine be bought from White Engines, Inc.

On March 16, 1980, TSARCOM awarded a contract to Cleveland Pneumatic Company for 241 collective sleeves for the AH-1 helicopter at total cost of $116,528. The procurement was formally advertised to four approved sources, one of which was the prime contractor for the AH-1. Only one acceptable bid was received. Since 1971 five other contracts have been awarded for the sleeve--four to Bell Helicopter-Textron, the prime contractor, and one to Cleveland Pneumatic. Although the item is classified as a competitive item, very little free and full competition has been obtained.

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USE

At the time the Secretary of Defense appeared before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request, the above information was presented and he was requested to furnish a response for the record.

RESPONSE

As previously discussed, our policy is to compete procurements whenever feasible and practicable. In many cases, however, it is not possible or cost effective to compete. Other firms may not have the technical data, know how, or facilities to produce the desired item. To obtain these items from other firms could be expensive, often prohibitively so. However, such actions should not be summarily omitted. All factors must be considered before reaching a decision on competitive possibilities.

We agree that reprocurement technical data should be obtained for spare and repair parts whenever possible. We also agree that restrictive procurement specifications should not be used.

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Report of September 23, 1981

UNCOORDINATED STOCK FUND PROCUREMENTS AND REASONABLENESS OF PRICES PAID

The Committee directed that an inquiry be made into the extent stock funded items are purchased noncompetitively by various elements within DOD and a review of procedures used by DOD to validate the "reasonableness" of prices paid on noncompetitive awards.

Determining the extent to which stock funded items are purchased noncompetitively is a major undertaking since DOD executes about 10 million procurement actions each year. Many of these actions are for stock funded items and there are at least 20 major procuring agencies. In addition, thousands of stock funded items can be procured locally by any of DOD's field units. Although there are about 10 million procurement actions each year, DOD only has computerized information for about 300,000 of these actions. While the percent of computerized actions is small, the obligated value of these contracts amounts to some $98 billion.

Accordingly, the Investigative Staff selected the 300,000 items for evaluation. A thorough analysis of this area will require a considerable effort which is currently underway, however, some preliminary results indicate that there appears to be considerable waste and duplication in the uncoordinated procurement of the same or similar items on contracts administered by one or more of the Defense Contract Administration Service (DCAS) Offices.

Analysis of Procurement Actions

An analysis was conducted of some of the 300,000 procurement actions managed by the DCAS offices located in Boston and Dallas. Instances were found of the procurement of the same Federal Supply Classes (FSC) within each of the regional offices, but the price differences were substantial for some of the items. For example, FSC 1005 (guns up to 30mm) are being purchased by both regional offices. In addition, the Boston office was administering contracts for these items for the Army, Navy, and Air Force. The table below shows classes of items that are being procured by the Boston and Dallas DCAS offices for the Army, Navy, and Air Force.

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TABLE 1

TABLE SHOWING SIMILAR FEDERAL SUPPLY GROUPS AND CLASSES OF EQUIPMENT PURCHASED BY THE ARMY, NAVY AND AIR FORCE WHICH ARE UNDER ADMINISTRATION OF THE SAME OR DIFFERENT DCASR's 1/

Federal Supply Group/Class	Boston			Dallas		
	Navy	Air Force	Army	Navy	Air Force	Army
Weapons						
10/1005 guns, through 30 mm	X	X	X		X	X
10/1010 guns, over 30mm up to 75mm		X	X	X		X
10/1015 guns, 75mm through 125mm	X		X			X
10/1095 miscellaneous weapons	X	X				
Aircraft and Airframe Structural Components						
15/1560	X	X	X	X	X	X
Tires and Tubes						
26/2640		X	X			X
Engines, Turbines, and Components						
28/2815	X	X	X			
Rope, Cable, Chains, and Fittings						
40/4010	X	X	X	X	X	X
Pumps and Compressors						
43/4310 compressors and vacuum pumps	X	X	X			
43/4320 power and hand pumps	X	X	X			
43/4330 centrifugals, separators, etc.	X	X	X			

1/ DCASR (Defense Contract Administration Service Region)

X Shown under DCASR indicates purchase of Federal Supply Class/items for respective service.

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The Investigative Staff also noted items with identical stock numbers were being purchased through different regional offices at different prices. For example, the Army has two contracts for the same item. It pays $29.42 for the item in the Philadelphia area but it costs $55 in the Dallas area. The Air Force has two contracts for an item which costs $1,579.20 in Atlanta but $3,250 in Boston. An analysis of different DCAS offices managing identical items is set out in Table 2 below.

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TABLE 2

TABLE SHOWING IDENTICAL NATIONAL STOCK NUMBERED ITEMS WHICH ARE PURCHASED FROM MORE THAN ONE CONTRACTOR

National Stock Number	Philadelphia	New York	Dallas	Atlanta	Boston
1610 00 623 3543				X	X
1610 00 670 2216				X	X
1610 00 945 1418				X	X
1615 00 409 5187	X	X			
1615 00 852 6712		X	X		
1615 01 059 4486		X	X		
1620 00 171 3505		X	X		
1620 00 967 1804	X		X		
1650 00 159 7749	X	X			
1650 00 633 1961		X	X		
1660 00 308 0997		X	X		
1680 00 182 3897		X	X		
1680 00 198 8613		X	X		X
1680 00 516 6543		X	X		
1680 01 049 6013	X	X			
1680 00 758 8597		X	X		

X Indicates purchase of item in more than one DCAS Region.

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The Investigative Staff is working with the DCAS data systems personnel at their nine regions to develop the full impact of the duplication and waste involved with the 300,000 procurement actions.

Investigative Staff Observations

Undoubtedly the services' failure to coordinate the procurement of consumable items with each other and DLA is duplicative and wasteful. The transfer of consumable items from the services to DLA poses a possible solution to this problem.

USE

The above information was presented in hearings when the Secretary of Defense appeared before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. The Secretary was requested to provide comments for the record.

RESPONSE

This segment is unclear. There is no apparent correlation between the identified Committee direction (investigate the reasonableness of prices paid for noncompetitive stock fund purchases) and the material offered by the Surveys and Investigations Staff. To the contrary, the Investigative Staff price examples suggest that the purchases may have been competitive. Table 2 also suggests competitive acquisition. In addition, price differences for identical items, even when significant, should not be accepted at face value as indicators of waste. It is fundamental that price variations occur for many reasons and individual purchase circumstances must be reviewed before judgments on price reasonableness can be attempted. Additionally, the discussion is misleading in that it indicates that the regions (DCAS offices that administer the contracts) make the purchases. Moreover, Table 1 would indicate that something is wrong when more than one activity purchases items such as tires. Each service manages items that use tires peculiar to a given weapon system. There is no advantage in the Air Force buying Army truck tires just because it buys aircraft tires. Also, for many cases, the volume of the services' requirements is not large enough to warrant one service or DLA buying the total requirement and it is, therefore, not uncommon for commodity managers to decentralize items for local purchase.

COMMENT

The report made two points. Tables 1 and 2 showed that there is an apparent lack of coordination between buying offices for the same type of item and there is an undoubted lack of interface between the contract administration offices. It is not unreasonable to conclude that these were the probable reasons for the wide divergence in cost paid for the same item in different parts of the country!

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It seems ludicrous for DOD to conclude that a 100 percent difference in price ** * * occur for many reasons and individual purchase circumstances must be reviewed before judgments of price reasonableness can be attempted."

Clearly DOD has a serious problem which requires concentrated management attention.

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CONTRACT COST PRINCIPLES-- ALLOWABLE OVERHEAD COSTS

The following information on allowable cost principles, including what are allowed overhead costs in procurement practices, covers three areas of concern.

-- Major defense contractors often include unallowable costs in their overhead pools.

-- Some procurement officials' negative attitudes towards Cost Accounting Standards (CAS) have weakened their value.

-- The misapplication of Economic Price Adjustment Clauses (EPA) by the Navy's Sea Systems Command (NAVSEA) continues to jeopardize the cost efficiency of ship construction.

USE

Summaries of these points were included for comment by the Secretary of Defense when he appeared in hearings before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. He was requested to furnish replies for the record which are included under each of the following sections.

Contractors Continue to Attempt to Pass Unallowable Overhead Costs to DOD

Despite numerous laws, regulations, and audit findings, defense contractors continuously attempt to pass on to the Government obviously unallowable costs in their overhead pools to the tune of millions of dollars. Defense Contract Audit Agency (DCAA) audits have documented numerous instances of accounting practices that fail to comply with the CAS or the Defense Acquisition Regulation (DAR). Additionally, some contractors are not providing adequate documentation to determine allowability, reasonableness, and allocability of questioned costs. Moreover, contractors have actually obstructed Government auditors' access to pertinent files.

DCAA's audits of defense contractors' forward pricing overhead rate proposals and final negotiated overhead rates are conducted to determine the reasonableness, allocability, and allowability of those costs used by contractors to develop their cost factors and overhead rates. Overhead rates are forward priced for procurement actions and then an audit is conducted at end of the fiscal year to establish the final rate. DCAA conducts its audits to determine if the contractor's financial statements and records conform to acceptable accounting standards, the cost principles

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as outlined in DAR Section XV, and the practices required by the applicable CAS. DCAA audit findings, however, are not binding on the contractor or the Government, but become a negotiable point between the contractor and the DOD contracting officers. While many of the DCAA's questioned costs are indeed negotiable items, others cannot be justified under any circumstances; yet, they are allocated by contractors to the overhead pool that is used to determine the overhead rates to apply to DOD contracts. DCAA's top 10 list of contractors with the highest amounts of "questionable costs" reads like the "Who's Who of Defense Contractors."

DCAA Audits Reveal Overhead Abuses by Defense Contractors

A review of selected DCAA audit reports by the Invstigative Staff reveals the following examples of questionable costs submitted by DOD contractors.

(1) $1,500 for 10 tickets to the premier of the movie "Superman."

(2) Over $16,800 from one company for the purchase of season tickets, with parking, for sporting events.

(3) $53,000 for a golf tournament.

(4) $266 for a tour of Tijuana, Mexico.

(5) $20,000 for office furniture that included bar stools, a stereo system, and a bumper pool table.

(6) Numerous tickets for symphonies, ballets, and civic events.

(7) Numerous instances of undocumented travel, including travel for spouses.

(8) Outing costs including $965 for rental of a party boat, $1,707 for food, $2,392 for liquor, and $589 for comboy hats.

(9) Millions of dollars for operating expenses of company airplanes which shows no attempt by the companies to conserve fuel, energy, and save money.

(10) Numerous business conferences/dinners for which no agendas were kept nor the list of participants available.

(11) Legal expenses for claims against the Government and defense against bribery charges.

(12) Advertising costs for giveaways of models, tie tacks, cuff links, etc.

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It is noted, entertainment costs are an unallowable contractor cost as prescribed by DAR 15-205.11.

One area of great concern is the cost associated with the operation of contractors' Washington, D.C., district offices in the name of public relations. One DCAA investigation determined that contractor employees in one office spent 10 percent of their time entertaining Government employees and the rest of their time in preparation for it. DCAA audits continuously identify costs associated with Washington office operations in contractors' overhead pools. When DCAA has asked for justification of the costs, contractors have obstructed access to their files.

The above are just a few examples of unallowable costs which contractors are including as a part of their overhead rates for Government contracts. These are not isolated situations but are discovered in audit after audit. The type of unallowable costs cited above were included by large defense contractors who have been doing business with the Government for years. The fact that these costs continue to be submitted, apparently unabated, suggests to the Investigative Staff that contractors are attempting to and frequently succeeding in obtaining excess costs (profits) on Government contracts. They must be aware that the Government's audit effort is constrained, and only a small percentage of these type costs will be identified. While the DAR is not always clear on every subject, it is quite clear on the unallowability of certain travel, entertainment, advertising, legal services, etc., costs.

While some DOD officials feel the above findings to be picayune, the Investigative Staff believes their continuous repetition makes this a serious matter. DCAA's limited audit capacity can only uncover a small percentage of these items. Moreover, most of the items cited were found on a sampling basis, so that it is impossible to know how many millions of dollars the Government has paid in the past and is paying now for unallowable costs.

Investigative Staff Obse-vations

The Investigative Staff feels that contractors should show good faith and ease the burden of the DOD procurement community by strictly adhering to established accounting procedures and to the DAR, by establishing an open relationship with Government (DOD), and by making a full disclosure from their files of the background information needed for a complete audit. DOD should also improve its management and monitoring of unallowable costs by publicizing its intentions to crack down on frequent violators and by actively seeking the cooperation of contractors to help hold down the number of such incidences. Any effort along this line will aid in reducing overall defense costs.

RESPONSE

The "Investigative Staff Observations" raise two primary issues. First, contractors can solve this problem unilaterally by including

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only allowable costs in cost pools allocated to Government contracts and by making full disclosure of their accounting records in an open and cooperative relationship with the Government. We certainly support this position. Second, the Staff recommends DOD "crackdown" on frequent violators. Discussion of "frequent violators" involves several related issues such as the method used to identify violations, the types of costs questioned, and the remedies available to the Government upon discovery of violations. Each of these issues will be briefly discussed.

Identification of violations: We support the appropriateness of the use by DCAA of statistical sampling methods. This method is the most practical.

Types of costs questioned: Costs questioned by DCAA generally fall in one of three categories: (1) unallowable costs, (2) allowable costs but unreasonable in amount or not properly allocable to the contract in accordance with the relative benefits received, and (3) costs questioned usually based on engineering or technical advice. Our policy for costs questioned under (1) above is that these costs are not negotiable. Contracting officers will not recognize these costs. Costs questioned under (2) and (3) above are negotiable depending on the contracting officer's analysis of the merits of the costs. Any judgment made with regard to the costs in (2) and (3) will be subjective in nature and cause disagreement between negotiating parties.

Remedies Available: The Defense Acquisition Regulation provides that unallowable costs will be disallowed when such costs are identified during prospective pricing situations. In addition, DAR permits use of historical data during evaluation of cost risk as a part of determination of the profit objectives. This policy encourages contracting officers to assign lower values to cost risk, resulting in lower profit objectives for contractors who historically include unallowable costs in their overhead projections.

More attention is being paid to the recommendations of contract auditors. On August 31, 1981, DOD Directive 5000.42 was issued to establish formal resolution and follow-up procedures for contract audit recommendations. Under the new regulations, all "significant" contract audit recommendations (those involving at least $500,000) must be addressed by the contracting official and eventually resolved. Any recommendation not resolved within 6 months must be tracked by the appropriate Service. The newly established Review and Oversight Office is developing methods to oversee the resolution and follow-up process for DCAA issued contract audits.

The Defense Contract Audit Agency (DCAA) has been at the forefront in the development of statistical sampling techniques for the past 15 years. These techniques permit the agency to perform audits of relatively small samples with a high confidence that the results of the audit are equally applicable to the total

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universe of which the sample is a part. For example, assume an auditor is reviewing a universe of 2,575 invoices with a value of $312,000. Statistical techniques indicate that a review of a sample of 94 invoices will permit the auditor to make statistically valid assessments of unallowable costs included in the universe of $312,000. If analysis of the sample of 94 invoices indicates each includes an average of approximately $11.60 in unallowable costs, applying this average to the universe would indicate a total of about $30,000 in unallowable costs. As a result, the auditor would question the $30,000 and have 90 percent confidence that the estimated cost questioned did not vary by more than plus or minus $5,000 from the actual unallowable cost contained in the universe. In order to have 100 percent confidence, the auditor would need to examine all the items and do 25 times the amount of work, which would be cost prohibitive. Because of this, we believe we can assure you that when DCAA performs audits using statistical sampling techniques, that undiscovered unallowable costs are minimal, particularly when it is compared to the additional cost we would be required to spend in order to identify each item of unallowable cost.

Negative Attitudes Towards the Cost Accounting Standards (CAS) Are Weakening Their Application to DOD Contracts

The Investigative Staff has found there is great controversy in the DOD procurement community concerning the application of the CAS. Some officials have stated the CAS are uneconomical, counterproductive, ineffective, and incomprehensible, and their continued usage can produce more harm than good. As a result, these officials are hesitant in enforcing the standards. Other officials find no problems with CAS and feel that the CAS have given them the necessary control and visibility of contractor costs. Nevertheless, the CAS have been expensive to implement, and the cost benefits of these standards have not been clearly established. The Investigative Staff does feel that the CAS serve a useful purpose, and their continual enforcement will make the cost accountability of contractors' prices easier.

The requirement that defense contractors file statements disclosing their cost accounting practices as a condition of their Government contracts is contained in the Defense Production Act of 1950, as amended in 1970, PL 91-379. At that time, the Cost Accounting Standards Board was established by Congress with the assigned task to promulgate the CAS to achieve conformity, consistency, and uniformity in contractors' cost accounting systems. The Cost Accounting Standards Board ceased to function as of October 1, 1980, when it was no longer funded by Congress for FY 1981.

As they now stand, the CAS, numbering 19, apply to all negotiated defense contracts and subcontracts in excess of $500,000 with the exception of those contracts where the price is based on an established catalog or commercial price. Exemptions are granted

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to small business firms, educational institutions, labor surplus area concerns, or to foreign countries.

As defined by the Cost Accounting Standards Board, a CAS is a statement that, "(1) enunciates a principle or principles to be followed, (2) establishes practices to be applied, or (3) specifies criteria to be employed in selecting from alternative principles and practices in estimating, accumulating, and reporting costs of contracts subject to the rules of the Board."

Despite Wide Coverage Cost-Effectiveness of CAS Cannot Be Determined

The CAS deal with a variety of subjects which involve the entire structure of cost accounting systems. CAS coverage is as follows:

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Standard Number	Coverage
401	Consistency in Estimating, Accumulating, and Reporting Costs
402	Consistency in Allocating Costs Incurred for the Same Purpose
403	Allocation of Home Office Expenses to Segments
404	Capitalization of Tangible Assets
405	Accounting for Unallowable Costs
406	Cost Accounting Period
407	Use of Standard Costs for Direct Material and Direct Labor
408	Accounting for Costs of Compensated Personnel Absence
409	Depreciation of Tangible Capital Assets
410	Allocation of Business Unit General and Administrative Expenses to Final Cost Objectives
411	Accounting for Acquisition Costs of Materials
412	Composition and Measurement of Pension Cost
413	Adjustment and Allocation of Pension Cost
414	Cost of Money as an Element of the Cost of Facilities
415	Accounting for the Cost of Defense Compensation
416	Accounting for Insurance Costs
417	Cost of Money as an Element of the Cost of Capital Assets Under Construction
418	Allocation of Direct and Indirect Costs
419	Not issued
420	Accounting for Independent Research and Development Cost and Bid and Proposal Costs

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Attempts by the Cost Accounting Standards Board to determine the cost-effectiveness of the CAS proved inconclusive. The Board could not succeed in developing a tool that could measure cost benefits derived from the CAS.

DOD procurement officials agree with the original intent of CAS to provide standards for defense contractors to use in establishing their accounting procedures for estimating, accumulating, and reporting costs on Government contracts. According to some procurement officials, CAS 401 (consistency in estimating, accumulating, and reporting costs) and CAS 402 (consistency in allocating costs incurred for the same purpose) represent reasonable and viable efforts toward the intended objective. The remaining standards as explained by one procurement supervisor, "have become an overly complex collection of technical accounting terminology which is hard to understand for nonaccountants. Poorly written definitions and explanations complicate the task of interpretation leading to many misunderstandings between the Government and the contractor and among Government procurement personnel (auditors, analysts, and contracting people). These misunderstandings result in seemingly endless debate and discussions of questionable productivity."

CAS has been expensive to implement by contractors and these costs have been passed on to the Government. One major contractor has spent over $7 million in CAS implementation, while CAS 410 alone resulted in one-time cost of $6.1 million to the Government from one aviation contractor.

Multiple Contract Actions Result from CAS Changes

DOD has issued guidance under CAS for orders placed under Basic Ordering Agreements (BOA). BOA's are often used for procurement of large volumes of sole-source spare parts from a single supplier. The CAS guidance is that each individual delivery order issued under BOA's is to be individually considered when determining the applicability of CAS. DOD procurement officials consider this impracticable when processing equitable adjustments for implementation of new standards or for voluntary changes made in the contractor's accounting systems. One DOD plant representative noted that under a BOA with the contractor, there were 188 orders. Therefore, 188 contractual modifications would have to be issued to impact a single BOA for a single accounting change.

Unauthorized Use of Appropriated Funds Can Occur Under CAS

Additionally, the Cost Accounting Standards Board advocated the use of the offset technique to minimize the number of contract modifications that would have to be issued to equitably adjust contracts for accounting changes. The offset technique is designed to equalize contracts with increased cost against those with decreased cost as a result of mandatory or voluntary accounting changes. This

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technique was supported by DOD. While this regulation is valid as far as it goes, it should be followed with reservations. What can happen is that offsets between contracts with differing appropriations, i.e., offsets between DOD contracts and Foreign Military Sales (FMS) contracts, may result in utilization of appropriations for purposes not authorized. For example, if an Army fixed price incentive contract with a decrease in cost incurred is offset against an FMS contract with an increase in cost incurred, the effect would be Army appropriations utilized to pay for the FMS goods or services clearly not allowed under FMS legislation.

DOD Contracting Officers are Slow to Respond to Contractor Noncompliance

DOD officials also expressed concern over some of the CAS administrative procedures. Current procedures require the contracting officer to provide a notice to the company of potential noncompliances within 15 days of receipt of a Defense Contract Audit Agency audit. The procedure does not anticipate a review by the contracting officer to determine, at that point in time, whether or not a noncompliance exists. In many cases, the DCAA opinion related to a potential noncompliance is not, at that point, fully supportable. As a result, the number of potential noncompliance items outstanding can accumulate pending a final decision on the part of the contracting officer. Therefore, issues of noncompliance are being referred on which there has not been a complete Government review and on which a Government position has not been firmly established.

Contracting officials, however, have been slow to react when a contractor has been cited as being in noncompliance with CAS. A DCAA audit noted that a major defense contractor was not complying with the provision of CAS 405, "Accounting for Unallowable Costs," on June 14, 1976, on the issue of cost for first class air travel and entertainment expenses. In November 1979, a DCAA audit revealed the same noncompliances and the same costs being questioned. Another major contractor was found by DCAA to be in noncompliance in eight different areas during a 5-year period. During that 5-year period, no determination was made by DOD contracting officials on the DCAA findings despite DCAA notification that, "a review of the contractor's accounting practices disclosed that failure to comply with CAS and/or DAR may result in increased costs to the Government."

Not all procurement officials agree that the CAS are overly burdensome to administer, nor do they feel that CAS has not produced the desired results. CAS has given them an extra control to assure that the Government is getting the best return for its dollars when dealing with contractors and they are considered effective tools to judge the merits of contractors' costs.

Investigative Staff Observations

The implementation of the CAS has resulted in an increased administrative workload for both the Government and the contractor and

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a corresponding increase in costs. However, the complaints of some procurement officials cannot be entirely justified. While there is no doubt some revisions of the standards are necessary, CAS provides the tools to determine the accuracy of a contractor's cost accountability on Government contracts. CAS can be only as effective as their application, and this effectiveness is weakened whenever contracting officials fail to resolve reports of noncompliance by a contractor in a prompt and timely manner. A previous section of this volume dealt with contractors' attempts to pass unallowable costs on to Government contracts. In view of the frequency of such occurrences, it would appear to justify the need for the CAS and make their enforcement a priority item within DOD.

The Investigative Staff believes that DOD should take action to ensure prompt response to any questions of noncompliance by a contractor so that they can be quickly resolved. Performance of this task in a businesslike manner will serve to put everyone on notice that previous contractor shortcomings will no longer be tolerated. Additionally, DOD should identify those areas of CAS that are in conflict with existing laws and regulations or are causing a severe administrative burden so that appropriate relief can be obtained.

RESPONSE

We agree with the Investigative Staff's report's suggestion that we should take prompt action to resolve noncompliance issues and to identify those areas of CAS that are causing severe administrative burden so that appropriate relief can be obtained. Our directive 5000.42, Contract Audit Follow-up, issued in August 1981, requires that all reported noncompliances be resolved within 6 months. Failure to resolve these issues results in a report to top management along with a schedule specifying when action will be accomplished. This will improve the timing in resolving these issues.

In connection with issues causing administrative burden, we have already identified a number of them. However, because Congress has not reassigned the now defunct CAS Board responsibilities to any organization, we do not have procedures outside of legislative action that can be used to amend the standards, or permit deviations therefrom in appropriate circumstances. We are, therefore, working through OMB to propose legislation assigning the CAS functions to the Executive Branch.

With respect to the general observation of the Investigative Staff's report concerning the negative attitude toward CAS within DOD, we believe the report overstates the situation. The preponderance of DOD personnel have worked long and hard to assure the proper implementation of CAS. GAO has made a number of reviews of our implementation and has given DOD high marks for our efforts.

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Naval Sea Systems Command (NAVSEA)
Continues to Practice Unsound
Contracting Policies in Applying Economic
Price Adjustment Clauses to Overhead

In a previous review of NAVSEA policies and related practices regarding economic price adjustment (EPA) for escalation in shipbuilding contracts, the Investigative Staff found serious deficiencies. The Navy's contracting methods allowed for substantial overrecoveries or underrecoveries of contract costs by shipbuilders. The NAVSEA indexes used to determine escalation on labor, material, and overhead costs did not reflect the rate of cost increase being incurred by the shipbuilders. Furthermore, NAVSEA was measuring escalation for overhead (indirect) costs by using a direct labor index which necessitated special contractual and pricing techniques, normally unfavorable to the Government.

The Investigative Staff recommended that NAVSEA (1) develop a policy that allows pricing of contracts with target cost that includes projected escalation at the rate anticipated at the time of negotiation with upward or downward adjustments in escalation based on variation from projected escalation rates, (2) tailor their material index to abnormal material fluctuations, and (3) determine a more equitable way of measuring overhead cost escalations by separating indirect labor and material costs.

NAVSEA Stands Alone In Its
EPA Contracting Methods

NAVSEA's deficiencies in handling economic price adjustments were again emphasized by the Investigative Staff early in this study. NAVSEA's response has failed to reflect an understanding of the deficiencies, and they continue doing business in the same old way--compounding the problem. The Investigative Staff has surveyed numerous other DOD procuring agencies and found that NAVSEA stands alone in its handling of EPA. Other DOD procuring agencies (including the Naval Air System Command [NAVAIR]) are providing for inflation in their contracts with EPA clauses in the following manner. Specifically, they have:

-- used an index for labor more reflective of the industry makeup,

-- provided tailored material indexes which account for unusual cost fluctuations of certain items of materials,

-- priced an estimated amount of escalation into the contracts, then provided for an abnormal fluctuation (plus or minus),

-- provided escalation for indirect costs by segregating those costs to the labor or material overhead pool, and

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-- not let the amount of escalation return affect the contract's target price, rather than placing a contractor in the position of overrecovering or underrecovering on his target price.

The Investigative Staff believes that this is the proper method for accommodating economic price adjustments, and this recommendation was made in a recent report concerning NAVSEA's contracting operations.

Investigative Staff Observations

The Investigative Staff can find no justification for NAVSEA's continuous insistence on handling EPA contract clauses as they have done in the past. The Investigative Staff believes NAVSEA's pricing system continues to be a Las Vegas-style gamble involving a "roll of the dice approach" in which one "roll" could result in "windfall profits" for the contractor or, conversely, another "roll" could result in serious losses to the contractor, necessitating a search for financial relief through the shipbuilder claims process.

RESPONSE

Defense made no reply to this point.

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Report of September 23, 1981

YEAREND SPENDING

The Committee expressed interest in ascertaining whether or not increased spending levels during the last 2 months of the fiscal year result in waste and unfavorable contracts.

An examination was made of more than 40 contracts awarded during the last 2 months of FY 1980 at seven major DOD procurement centers across the country. Based on this examination, yearend spending does not appear to be a major problem, but there are, however, pressures to obligate funds at yearend that occasionally lead to award of unfavorable contracts or to procurement of low priority items.

San Antonio Air Logistics Center (SA/ALC)

To illustrate, the SA/ALC obligated $2.6 million without the normal protections of DOD procurement procedures because of a yearend rush to spend money budgeted for contract overhaul of F-4 aircraft engine noise suppressors. Near the end of FY 1980, the office managing noise suppressor overhaul dumped 10 urgent purchase requests on the contracting office, requesting procurement action in time to obligate FY 1980 funds. The contracting office responded by issuing unpriced orders for the repair requirements. The contractor began work without the incentives to control costs that a fixed price contract provides.

The contracting office awarded unpriced orders covering the 10 overhaul projects, obligating some $2.6 million during August and September 1980. The contracting officer justified award of unpriced orders based on the urgent need for repairs claimed to exist by the office managing noise suppressor overhauls.

Circumstances surrounding these orders suggest that the urgency involved budgetary factors as much as operational needs. One of the suppressors had been inspected by the manufacturer in November 1978, but the repairs proposed at that time were not contracted for until August 1980. There is no evidence of operational problems or restrictions to support the sudden designation of the repairs as urgent. Two other units had been inspected in January 1980. The office managing suppressor overhauls did not request inspections on the remaining seven suppressors until April 1980, even though they were aware the units were due for overhaul during FY 1980.

It is difficult to estimate the monetary impact of issuing unpriced orders for these requirements. The "not-to-exceed" prices totalling $2.6 million initially established for the work were eventually negotiated down to a total of $1.8 million after review of contractor cost and pricing data by the Defense Contract

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Administration Service and the Defense Contract Audit Agency. The Defense Acquisition Regulation described firm-fixed-price contracts as providing contractors the strongest incentives to control costs. In contrast, the contractor began to incur costs on these unpriced orders even before his cost proposal had been evaluated and had incurred between 35 percent and 40 percent of total costs on various overhaul projects before price negotiations began.

Air Force Systems Command
Ballistic Missile Office

While the following example does not illustrate less than favorable terms were obtained by DOD contracting personnel, it does illustrate an example of them effectively overcoming Congressional funding limitations.

The Air Force Systems Command's Ballistic Missile Office (BMO) awarded a $1,500,000 firm fixed price, level of effort contract on September 23, 1980, to continue technical engineering services for FY 1981 in support of the non-Development System Engineering/ Technical Assistance for the Minuteman Force Improvement Program. BMO funded the effort with its 1978 multiyear production appropriation which had an expiration date of September 30, 1980. In order to fund within the deadline, BMO made the contract effective on September 30, 1980, rather than the first day of the new fiscal year, the normal starting day for level of effort contracts. This contract continued the work under an existing contract that provided the same service through September 30, 1980.

The BMO contracting officer said that using the 1978 appropriation to continue the work through FY 1981 was legal because the funds were obligated before the appropriation expired. Also, the contracting officer stated that the contractor provided services on September 30, 1980, under the new contract. However, the Investigative Staff found, by checking time cards, the contractor had not performed services on September 30, 1980, under the new contract and, in fact, did not start work on this contract until FY 1981.

We believe that using the 1978 funds for the 1981 effort exceeds the bonafide need of the 3-year period for which the funds were appropriated and permits use of the funds over 4 years. Had the contract been effective on October 1, 1980, new appropriation authority would have been required to fund the effort.

USE

The above information was provided to the Secretary of Defense for comment during an appearance before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. He was asked to reply for the record.

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RESPONSE

While the report itself did not identify yearend spending as a major problem, it is our policy that such spending should, in fact, be in support of requirements and not merely to obligate expiring funds. The F-4 engine noise suppressor overhaul requirements, cited as an example of yearend spending, were a recognized requirement. However, they were temporarily deferred to permit the funding of high priority requirements. Late receipt of FY 1980 DOD O&M Supplemental Appropriations funding further restricted SA/ALC's ability to contract for the required repairs. When SA/ALC personnel received additional funds, purchase requests were promptly submitted.

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Report of September 23, 1981

IMPLEMENTATION OF CHANGES IN FEDERAL POLICY FOR ACQUIRING AND DISTRIBUTING PRODUCTS

The Office of Federal Procurement Policy issued its Acquisition and Distribution of Commercial Products (ADCP) policy in May 1976. The policy mandates that Government agencies purchase commercial products and use commercial distribution systems whenever such products or systems satisfy the Government's needs. The policy recognizes that implementation would require major changes in current procurement practices. The program for acquiring commercial products in lieu of Government specification items has progressed slowly, and achievements so far have been very limited. The program for relying on commercial rather than Government distribution systems has made virtually no progress, and there are serious concerns as to whether the cost to implement the program as it is currently conceived is justified. At issue is the necessity for and the viability of military specifications for commonly used, commercially available items. It is posited such specifications may be needlessly adding to the procurement cost of these items.

Within DOD, the Defense Logistic Agency (DLA) established two programs to implement the ADCP policy--the Commercial Commodity Acquisition Program (CCAP) and the Commercial Item Support Program (CISP). DLA manages about 2 million common-type consumable items used by the military services. Many of the items are of relatively low value and have low demands.

Commercial Commodity Acquisition Program

The CCAP is intended to identify commercial products that can be procured to meet user needs in lieu of items produced to Government specifications. CCAP was initiated in January 1977 on a pilot program basis and became a regular and continuous program in September 1978.

DLA supply centers are responsible for identifying items for consideration under CCAP based on anticipated procurement values and center personnel's knowledge of the type of items and the industries from which they are purchased. Candidates are submitted to the DOD unit responsible for preparing purchase specifications for the commodity. These units are responsible for obtaining user input and performing market research and analysis to determine whether it is feasible to develop a commercial item description for use in procuring an item.

User input is needed to define specific needs and features required in an item. Market research and analysis is needed to determine what commercial products are available to satisfy user needs, how the products should be described in a procurement document, and the best procurement and delivery methods.

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If a commercial item description is developed, it must then be submitted for approval by users. Within DOD, approval for some types of commodities must be given by a joint service board or committee. For other commodities, approval must be obtained from each using service. If full approval is given, the description can be used to procure the items DOD needs. If there are Government users of the item outside of DOD, the description is submitted for their approval. If approved by all other users, it becomes a Federal purchase item description. This is clearly a cumbersome and time-consuming process.

Commercial Item Support Program

The CISP is intended to identify commercial items procured by DOD that can be readily obtained "off-the-shelf" from commercial suppliers' existing distribution systems in lieu of stocking items and distributing them from Government depots. In January 1977, DOD directed DLA to develop a plan for CISP. The plan was approved in November 1977. Efforts to implement the plan resulted in little or no impact in achieving the program objectives, and DLA is currently making significant modifications to the plan which are intended to redirect its efforts and to develop revised implementation procedures.

Implementation of CCAP

Within DLA, the Defense Personnel Support Center (DPSC) is responsible for buying and managing subsistence, medical, and clothing and textile items. It purchased over $2 billion of the commodities it manages during FY 1980. Many of the products purchased using Government specifications are either already commercial items or similar to commercial items. It would appear, therefore, that many items purchased by the center are candidates for consideration under both or either the CCAP and/or CISP. DPSC has made, however, only limited progress in achieving CCAP objectives and almost no success in achieving CISP objectives.

CCAP--Subsistence

DPSC manages about 1,440 subsistence items (excluding brand name, nonperishable items procured for resale in Army and Air Force overseas commissaries under the Direct Commissary Support Program) and procures about $1.65 billion of such items--$1.2 billion for perishable items and $450 million for nonperishable items. During the CCAP pilot program, 20 nonperishable items were submitted to the Army Natick Research and Development Command to determine whether commercial item descriptions could be developed. The items submitted--sugar, salad dressings, and various condiments--were approved for submission by a DPSC subsistence ADCP item selection panel. Commercial item descriptions were developed for the 20 items and approved. Initial procurements, valued at about $1 million, were made for the 20 items using the commercial item descriptions.

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As of May 1981, an additional 276 items were submitted as candidates for commercial item description development. Of the 276 items, commercial item descriptions have been developed and approved by DOD for 53 items. Initial procurements using the descriptions amounted to about $31 million. DPSC did not attempt to determine whether any procurement dollar savings were realized as a result of buying the commercial items. DPSC personnel indicated, however, that faster deliveries were made and that no problems developed as a result of using the commercial item descriptions.

There are still 223 candidates for which no decision has yet been made concerning commercial item description development and approval. These include 37 bakery-type items submitted in April 1980 and 186 items submitted in December 1980 for which the existing specifications prescribe that the products should be of a high commercial grade. An additional 19 items were under consideration as candidates in June 1981.

CCAP--Medical

DPSC manages about 17,000 medical line items (items assigned a national stock number). The line items relate to about 1,400-1,500 different drug products, several hundred different medical devices, several hundred different nonmedical laboratory items, and about 2,000 repair parts for the medical and laboratory items.

During the CCAP pilot program, eight medical items were selected as candidates to be submitted to the medical directorate's technical services unit for the purpose of determining whether commercial item descriptions could be developed. Descriptions were developed by the unit and subsequently approved for six items. Decisions on two additional items were deferred because they were included in a joint DOD and Veterans Administration project to establish a single system within the Government for procurement of medical items.

Five items were procured using the commercial item descriptions, of which four were for direct delivery of items to users. Solicitation of offers was made for an additional item which specified direct delivery. The solicitation was cancelled primarily because of anticipated direct delivery problems. In addition, direct delivery problems were experienced under two of the awarded contracts.

Subsequent to the pilot program, DPSC developed and obtained approval for use within DOD of commercial item descriptions for about 800 drug products and 200 medical devices. Although Government specifications were previously used to procure these items, the delivered product was usually a commercial item. Non-Government standards existed for almost all the drug items, making the development of commercial item descriptions a relatively simple task.

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CCAP--Clothing and Textiles

DPSC manages about 25,000 clothing and textile line items which relate to about 2,500 different products. During the pilot program, 19 items were submitted as candidates for possible development of commercial item descriptions. Each item was submitted to the unit of the user's military service responsible for development and preparation of item specifications. Commercial item descriptions were developed and approved by the using services for 10 items. The remaining nine items were rejected on the basis that acceptable commercial items could not be found.

Contracts amounting to $7.9 million were awarded for all 10 items with approved commercial item descriptions. The prices paid when compared to previous prices did not disclose a definite trend--either higher or lower price. While some quality problems were reported, slight modifications to the purchase descriptions resolved them. The procurements did increase the number of bids received and decreased the delivery periods for the items.

After completion of the pilot program, 46 new candidates were submitted, of which 33 were not approved because they were considered to be military-unique or were items required to be procured from the Federal Prison Industries. The remaining 13 items are still in process. Subsequently, 10 additional candidates were submitted. Approval for use of developed purchase descriptions was recently obtained for three items, and decisions on the remaining seven items is still pending.

CCAP--Observations

Although the CCAP has been in effect for over 4 years, implementation efforts have progressed very slowly. Since completion of the pilot program, approval for use of commercial item descriptions within DOD were obtained for only 53 subsistence items and 3 clothing items. While approval was obtained for a large number of medical items, the product previously obtained for most of these items was already a commercial product, and developing revised purchase descriptions was a relatively simple task.

Recent efforts to identify additional candidates have somewhat intensified, but even at this pace, significant attainment of program objectives appears questionable. Full implementation of the program will require considerably more effort, a greater willingness by DOD using activities to accept commercial products, and a willingness by DOD procurement personnel to explore new acquisition strategies. The Investigative Staff believes this program has merit and that DOD should intensify its effort. It is obvious that whenever changes are made to purchase commercial products, there are tangible savings in available funds, resources, and manpower requirements. Moreover, the day-to-day burden of accounting, storing, inventorying, and issuing of the products is shifted from the Government to the private sector.

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Implementation of CISP

DPSC has only attempted to procure five medical items utilizing commercial distribution systems. The items were also part of the CCAP pilot program. No such procurements of subsistence and clothing and textile items have been attempted.

A solicitation of offers for opthalmic lenses was cancelled when the using services cited anticipated problems with overseas deliveries, minimum order quantities, and package markings. Contracts allowing activities to place orders directly with and to accept deliveries directly from contractors were awarded for two items--clinical thermometers and chlordiazepoxide HCI capsules. Contracts requiring placement of orders through DPSC but specifying direct delivery to using activities were awarded for two additional items--X-ray film and dental silver alloy.

The contract for clinical thermometers was subsequently altered to eliminate the direct ordering and delivery provisions because the contractor would not deliver on orders for less than 144 thermometers and ignored orders for less than this quantity. A contract for the capsules was not renewed because longer delivery times were experienced when compared to the times previously experienced by issuing the item from depot stocks.

Contracts for X-ray film and dental silver alloy were considered to be successful although significant administrative workload is required to furnish silver to contractors as Government-furnished material. The Government is required to replace the amount of silver used in the quantities of the two items ordered by the Government.

CISP--Observations

DLA efforts, over a 4-year period, to implement CISP have been primarily devoted to developing an elaborate and complex screening process and a mathematical cost model to identify products that can be obtained from commercial distribution systems. Virtually no success was attained, and in August 1980, DLA deferred further implementation efforts pending development of new guidelines.

The original CISP contained eight criteria for excluding items from the program. At a DLA meeting in February 1981, 11 additional exclusion criteria were approved and 4 more were being analyzed. One of the approved criteria provides for a manual review by the item manager of an item that has filtered through all the exclusions to determine whether characteristics exist beyond the established exclusions which should eliminate it from the program. Changes to the economic cost model were also discussed at the DLA meeting.

DLA efforts to implement CISP appear directed primarily towards finding reasons for excluding items from the program and

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continuing rather than changing current procurement practices. As currently conceived, the program appears to have little chance of significant success in attaining its objectives, and serious concern arises as to whether its implementation cost is justified. This concern was previously expressed by the House Appropriations Committee in its FY 1979 hearings.

USE

A summary of this material was furnished to the Secretary of Defense for comment during an appearance before the Defense Subcommittee to discuss the FY 1982 Defense Appropriation request. He furnished the following reply for the record.

RESPONSE

The report observes that the Acquisition and Distribution of Commercial Products (ADCoP) program to acquire commercial products that satisfy Government requirements has not been pursued aggressively in the past. This Administration will give increased attention to this program.

The Commercial Commodity Acquisition Program (CCAP) was one of two pilot programs established to initially implement the ADCoP policy. The experiences of this pilot program, concluded in September 1978, were to be used as the foundation for establishing DOD policy for acquiring commercial products.

Defense Logistics Agency (DLA) Supply Centers have taken the initiative in identifying items for consideration under ADCoP. In a special study done last year, DLA Supply Centers identified 373 Government specifications which account for DLA's high dollar (more than $100,000) buys. These were reviewed by the cognizant specification preparing activities who concluded that the items described in 55 of these specifications were commercial in nature. Projects have been initiated to develop commercial item descriptions. Another 95 specifications will require a further review.

While it may appear that the development of a commercial item description is a "cumbersome and time-consuming process," proper coordination and approval of these documents by all users is absolutely essential to the success of this program. As a matter of fact, the coordination of commercial item descriptions is performed on an expedited basis as compared to the normal Federal and military specification coordination process.

A new CISP plan has been developed by DLA. In the first phase, a review was made to ensure that items selected for support via commercial distribution do not affect military readiness. Then a computer model was developed to compute the total cost of acquiring, storing, and issuing items to determine the most economical method of management. Based on the computer model, DLA will select items most likely to be supportable by the commercial market. Finally, a procurement analysis will be made to

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determine if sources are available that will stock and issue items to support customer requirements within established time frames. The new plan is underway, and full implementation at the Defense Supply Centers is scheduled for the first quarter, FY 1983.

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NEGOTIATED AND SOLE-SOURCE CONTRACTS FOR SERVICES

The Committee expressed interest in DOD's use of contractor personnel rather than in-house personnel. Problems exist in contracting for engineering, maintenance, technical, and logistic support services because of continuous reliance on contractors rather than DOD personnel. Collectively, the problems and their causes directly or indirectly increase overall costs and foster sole-source procurements.

San Antonio Air Logistics Center (SA/ALC)

The SA/ALC has not taken full advantage of the competitive discipline to minimize the cost of contract repair services. While repair contracts are initially awarded competitively through small business restricted advertising, subsequent extensions negotiated with low bidders result in inflated costs to the Government. Analysis of a series of contracts, totaling about $8.6 million, for repair of ground support equipment items indicates that negotiated contract extensions resulted in the Government paying about $1.2 million more than the going competitive rate for repair services.

The SA/ALC has contracted for Air Force ground support equipment repairs for several years. The contracts generally cover all Government requirements for selected items or categories of support equipment. Bidders quote a firm fixed price per labor hour. When an item of equipment is sent to the contractor for repair, the contracting officer negotiates a quantity of labor hours to complete repairs. The Government either furnishes, or reimburses the contractor for, spare parts and direct materials needed in the repairs.

The following chart depicts the periods of coverage and the prices per labor hour applicable to various repair contracts evaluated. The specific items repaired under the contracts, of course, differ, but all fall into the general category of ground support equipment. The workload and mix of skills required under the contracts is essentially similar. It is noteworthy that the prices obtained through competitive bidding are uniformly lower than prices obtained on negotiated contract extensions. Particulars on the various contracts follow.

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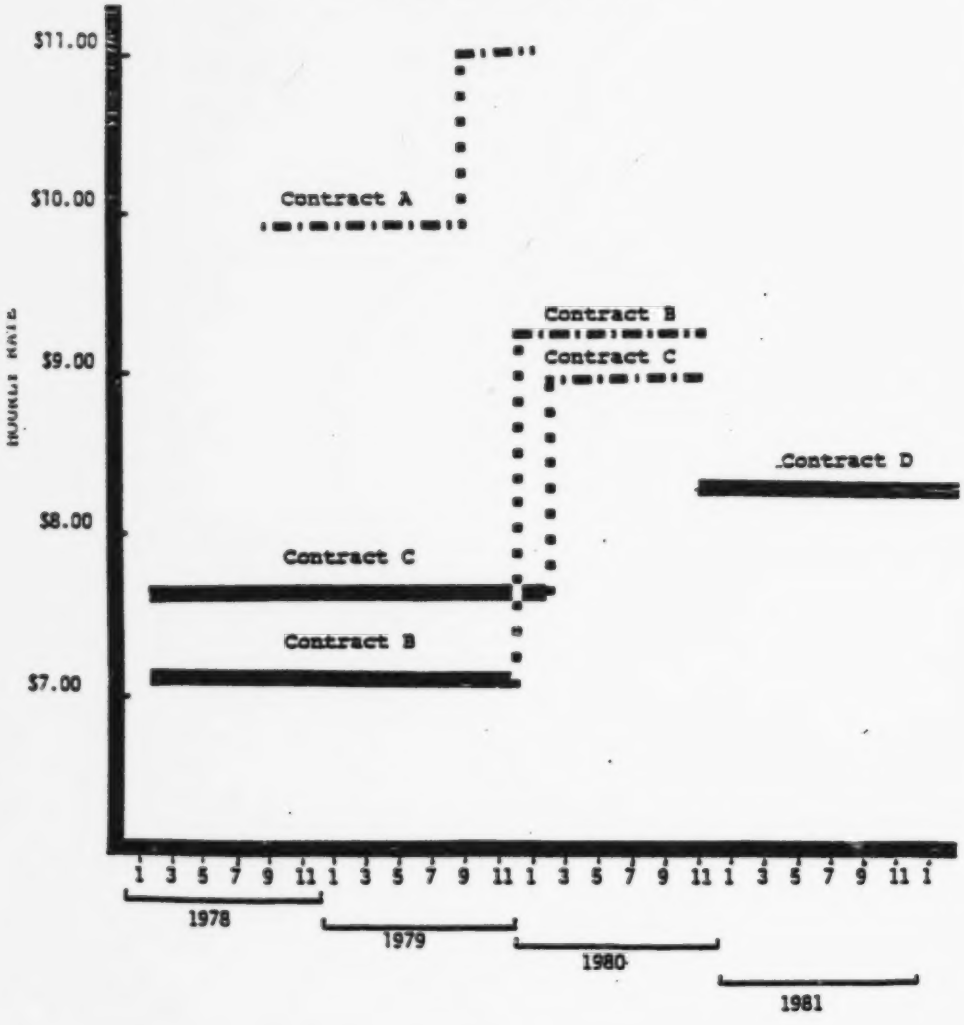
LABOR HOUR RATES ON RECENT REPAIR AND OVERHAUL REQUIREMENTS CONTRACTS



Rates based on competition.

Negotiation

Negotiated rates for extensions of initially competitive contract

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Contract A is the final extension of a contract initially awarded competitively in 1972. At the time, Air Force Logistics Command (AFLC) policy provided for extending repair-requirements contracts for 5 years after initial competitive awards. In addition to the 5 years contemplated in AFLC policy, contracting personnel provided for further extensions of 120 days at the end of each basic year. A 9-month delay in awarding the first extension year further stretched out the contracting period. The negotiated prices of $9.90 and $11.00 per labor hour are considerably higher than the $7.67 per hour prices the same firm offered under competitive circumstances for similar work on contract B shown at the bottom of the chart.

Contracts B and C stem from a competitive solicitation for additional support equipment repairs and had a fixed 2-year term. The contracting office extended the initial term of both contracts because of delays in soliciting a follow-on contract. In June 1979, contracting personnel reminded the user activity that these two contracts were about to expire and that purchase requests for follow-on requirements should be submitted in time to permit a competitive solicitation. Disagreements on contract format and on specific items to be covered in the follow-on contract delayed solicitation until August 1980. This delay resulted in extensions of 120 days and 180 days in the ordering period and negotiated increases in contract prices.

Contract D was awarded competitively, effective December 1980. The low bidder, the firm that negotiated a price of $9.21 per hour on Contract B, submitted an initial bid of $8.80 per hour and a best-and-final-offer of $8.20 per hour on this contract. The contract has a 2-year term and provides for an option to extend the term for 1 additional year.

Negotiation Procedures

Accepting negotiated prices significantly increased the cost of support equipment repairs over going competitive rates. Competitive pricing would have resulted in savings totaling $1.2 million on repair services that cost about $8.6 million, a discount of about 14 percent.

Some portion of the negotiated price increases on the extensions of the foregoing contracts was unavoidable. The contracts are subject to the Service Contract Act, and the Department of Labor (DOL) determines minimum wage rates for various categories of personnel. For the contract extensions examined, DOL issued new wage determinations providing for higher rates to be paid during the extension periods. These higher costs were the primary factor in allowing an increased contract price. Relative to contract B referred to above, the price increase allowed was greater than the DOL-required increase in labor costs. The negotiated price increased from $7.14 to $9.21 per hour, or about 29 percent. However, the wage determination only increased the contractor's average minimum labor cost from $5.34 to $6.07 per hour, or about 14 percent. The contract

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price is intended to cover indirect costs as well as direct labor. Thus, the "mark-up" on direct labor available to cover overhead and administrative costs increased from about 14 percent to about 52 percent.

Contracting personnel did not perform a thorough review of the contractor's proposed price increase. The extension was intended to last only 120 days and was negotiated in an expedited manner. In evaluating the price increase, price analysts applied the contractor's experienced overhead and general and administrative expense rates to an assumed $1 per hour increase in wage rates. They concluded that the proposed increase was fair and reasonable. The average labor rate increase, however, amounted to only $0.73 per hour, and following the analytical concept used, would have supported a price increase of only $1.60 per hour rather than the $2.07 approved.

Price analysts stressed the differences between competitive and negotiated price setting. In a competitive situation, they explained, contractors may be willing to accept below-normal profits in order to build volume or to operate at a loss to avoid disbanding a skilled labor force. In negotiating a price, the Government is unaware of a contractor's willingness to accept below-normal returns. Commenting on the $9.21 price negotiated, a price analyst stated that the price was quite favorable because the contractor could have justified a price of $14.70 per hour under DOD cost principles.

The San Antonio ALC has to rely on contract or technical support to keep critical test equipment working for the fuel control of the F100 jet engine. Air Force technicians perform final tests and calibration of fuel controls on a specially designed, computer-controlled test stand. Since Air Force personnel lack the expertise and technical data to repair all components of the test stands, the Air Force has contracted with the manufacturer to provide three electrical engineers and one mechanical engineer. These personnel provide maintenance and train Air Force personnel in repairing the test stands. A program manager stated that without contractor technical support, the F-15 aircraft would probably not be flying.

The fuel control of the F100 jet engine, designed at the outer limits of technical complexity, is difficult and costly to maintain. The Air Force has made major investments in facilities and equipment needed to overhaul the fuel control, but limited overhaul capacity represents near-term constraint on supporting wartime operations. Further, the Air Force must rely on contractor technical support to keep critical test equipment running.

An Air Force official acknowledged that designers of the fuel control may have gone too far in building complexity into the control. Designed to optimize engine performance, adjusting fuel delivery based on altitude, temperature, and other factors, the control spends about 1 hour in the shop for overhaul and calibration

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for every 1 1/2 hours spent in the air. Numerous interrelated internal adjustments in the fuel control require about 300 hours of work on a computer-controlled test stand for final testing and calibration.

None of this comes cheap. Current investment in facilities and equipment for fuel control overhauls totals about $50 million and is expected to reach $100 million eventually. The Air Force estimates labor costs for overhauling the fuel control at about $20,000 per unit or about $12 million annually.

There are a number of interesting aspects to the technical support contract for the test equipment. The price negotiated for the services of the four engineers is $342,000 annually, equivalent to about $85,500 per man per year. The actual labor cost of providing engineering services, however, is about $30,600 per man per year. Training, travel, and relocation costs for the engineers are, of course, included in the total contract price, but the price also includes about $24,000 per man per year in labor overhead costs and about $15,500 per man per year in general and administrative costs. The labor overhead rate allowed on the contract is applicable to efforts performed in contractor facilities rather than Government facilities and includes certain costs not logically allocable to the contract.

The DCAA auditors who reviewed the contractor's cost proposal did not develop a separate overhead rate because the particular division performing the work has only one contract involving off-site performance. For another company division that has several contracts performed in Government facilities, the company is projecting FY 1981 overhead rate of 96 percent for projects performed in company facilities and 46 percent for off-site performance.

The technical support contract also provides for reimbursing the contractor for parts and supplies needed to keep the test stands running. Estimated expenditures for parts and supplies for an 18-month period will total $750,000, about 70 percent of which is for repair and overhaul of major components and about 30 percent for purchase of new components. In effect, the technical support contract has buried in it a major procurement authorization managed by the contractor without some of the normal controls of DOD purchasing procedures. Further, the Air Force does not have the visibility of spare parts failure and usage rates needed to perform effective logistics planning for the test stands.

Naval Regional Contracting Office--Philadelphia

In FY 1980, this Navy office awarded contracts valued at about $262 million to provide technical representative, training, and professional technical and management services, of which about 88 percent were awarded without benefit of competition. A review

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of 11 of the contracts disclosed one or more instances of the following issues:

Nine of the contracts reviewed were sole-source renewals of previous contracts for the same or similar services. Renewals had occurred over as much as a 9-year period, and sole-source justifications cited the contractor's in-depth knowledge and expertise acquired in providing the services. Many contracts contained justification statements that current workloads, personnel ceilings, and/or personnel losses were the cause for the lack of in-house expertise. None of the contracts contained documentation supporting the lack of in-house capability or firm indication when reliance on contractor services would no longer be necessary because DOD personnel could perform the services. The contracts had the effect of continual buying of contractor personnel to augment the DOD work force and procuring their services on a sole-source basis. The following is an example.

A 1-year cost plus fixed fee type contract was awarded on a noncompetitive basis to provide contractor maintenance services for the out-of-production CH-46 helicopter at an estimated cost of $374,917 if all labor effort options are exercised. The award renewed a previous sole-source contract for the same type of services.

Although the helicopter has been operational for many years, the Navy stated, "Civil servants with proper background, facilities, and indoctrination could do this work. Such personnel are not presently available to this Command, nor will they be at any time in the foreseeable future." Before expiration of the contract, a modification was issued extending the contract period an additional year at an additional estimated cost of $374,986 if all labor effort options are exercised. Consequently, it appears that reliance on maintenance services provided by the sole-source contractor will continue over the remaining operational life of the helicopter.

The Navy's inability to develop specific statements of required work restricts competition and results in the use of types of contracts that provide the contractor little incentive to effectively control costs.

In all but one contract reviewed, the procurement activity decided to use either a cost plus fixed fee (CPFF) or a time and materials (T/M) type contract rather than a fixed price type contract. The activity's justifications for its decisions were statements that the exact nature and extent of the work to be performed and the precise method of performing the work could not be established in advance or that specific requirements could not be definitely established.

It would appear that the contractors often develop the statements of work because most of the contracts were of a

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continuous nature or an award was made in response to an unsolicited proposal. Sufficiently specific statements of work would, in some instances, allow additional firms to submit offers and, thereby, increase competition.

The use of a CPFF or T/M type contract may also result in other additional costs. A CPFF type contract provides for reimbursement of costs plus payment of a fixed fee. The fee does not vary in relation to the contractor's ability to control costs. There is little incentive, therefore, for the contractor to effectively control costs.

The T/M type contract provides for the procurement of supplies and/or services on the basis of direct labor hours expended which are paid for up to a total ceiling price at negotiated labor hourly rates which include profit, overhead, and general and administrative expenses. This type contract should be used only when it is not possible at the time of contract award to estimate the extent or duration of work or to anticipate costs with any reasonable degree of confidence. Because the contractor's profit increases proportionally to the expenditure of labor hours, this type of contract does not provide an incentive to effectively control costs.

Many of the contracts reviewed at the Regional Contracting Office contained modifications which significantly increased the original estimated contract cost. In addition, the modifications increased the level of labor effort, the scope of work, and/or the contract performance period. These type modifications strengthen a contractor's sole-source position.

One or more modifications increasing the original estimated contract cost were found in 7 of the 11 contracts reviewed. The original amounts for the seven contracts increased from $2.9 million to $6.1 million as of May 1981. There were modifications (1) exercising contract option clauses increasing the level of labor effort in six contracts, (2) extending the contract performance period in five contracts, and (3) increasing the scope of work in four contracts. To illustrate:

A cost plus fixed fee contract was awarded in January 1980 at an estimated contract cost of $126,750 for a maximum of 5,808 man-hours of direct labor to provide technical and engineering services. The contract included an option clause that would permit the Government to increase the authorized man-hours by 50 percent. The contract performance period was 3 months. The Government exercised the option within the period at an additional estimated contract cost of $63,482. The contract performance period was also extended by about 5 months.

In August 1980, an additional task was added to the scope of work at an additional estimated contract cost of $27,051. In September 1980, two additional tasks were added to the scope of

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work at an additional contract cost of $118,000, and the contract performance period was extended an additional 12 months. As of May 1981, the original estimated contract cost had increased from $126,750 to $335,283, and the contract performance period had increased from 3 months to 20 months.

USE

A summary of the above information was provided to the Secretary of Defense for comment during his appearance before the Defense Subcommittee to discuss the FY 1982 Defense appropriation request. He provided the following reply for the record.

RESPONSE

Our policy is to compete these repair and maintenance type contracts whenever possible, either through formal advertising or competitive negotiation procedures. A new position has been established in the Office of the Under Secretary for Research and Engineering to assure the propriety of service-type contracts for studies and other professional and management support.

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Report of September 23, 1981

ENGINEERING AND TECHNICAL SERVICES PROGRAMS

Introduction

The Committee has expressed interst in engineering and technical services provided by contractors in support of weapons systems fielded by the military services. The Investigative Staff previously submitted information on this subject, showing extensive use by the military of contractor employed technicians. A continuation of the inquiry suggests the DOD and military services have accepted a "fact of life" dependency on contractor support without resolution of the problems such dependency will create under battlefield conditions.

DOD Management

The DOD in its directive 1130.2 (Management and Control of Engineering and Technical Services), indicates and attempt to regulate the transfer of technical knowledge from producers of new equipment and systems to DOD personnel and thus assure self sufficiency of wartime battle units. The directive, however, has been in force for at least 15 years and during this period the military departments have actually increased their reliance on contractor support.

The DOD directive, revised in June 1979, essentially deals with management of in-house and contractor-supplied engineering and technical services for the purpose of training and instruction. In the directive, contractor support services are categorized as "contract plant services;" "contract field services" (CFS); and "field service representative" (FSR). A description of contract plant services suggests a logical and necessary approach to technical training of DOD and military personnel at manufacturing plants in the installation, maintenance, and operation of weapon systems and components. The functions of CFS and FSR personnel are less defined. Their duties which appear synonymous are generally associated with field training. There is a consensus within DOD that these contractor personnel also participate in "hands on" maintenance.

Management instructions set forth in the DOD directive emphasize the CFS category leaving one to surmise whether the same instructions are applicable to the FSR category. Theoretically, employment of CFS personnel is limited to the necessity for accomplishing a military mission where use of in-house personnel is impractical. Under these conditions CFS employment is not to exceed 12 months after the military component achieves self sufficiency in the use of new equipment. The Investigative Staff has learned this is an arbitrary period, selected as a point of reference, routinely waived,

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and generally invalid as a constraint in the use of contractor engineering and technical services.

The DOD directive established a reporting mechansim to be followed by the military services, and it instructed that each military service establish a single manager to coordinate all engineering and technical services used. The Army, Navy, and Air Force followed with separate in-house instructions, and with the exception of the Air Force, redelegation of management responsibility to lower field units. Predictably each military service performs differently in carrying out the DOD instructions resulting in varying degrees of compliance. Representatives of all three military services contend, however, that the directive applies only to those contract employees engaged in instruction and training. A DOD spokesman responsible for execution of the directive generally agrees with the military services' interpretation, additionally he believes that the directive might be applied to contractor supplied "hands-on" maintenance.

The Air Force appears to have come closest to following terms of the DOD directive by the appointment of a program coordinator at headquarters level. However, information collected and compiled by this individual is limited to operations not exceeding the security classification "secret." This aberration coupled with "guess work" used in developing contractor cost information makes the data collection function valueless. Other responsibilities vested with this Air Force headquarters element is not viewed by the Investigative Staff as having significant constraint on Air Force use of contractor supplied engineering and technical services.

The Navy has ceased central data collection as required by the directive. A Navy representative responsible for the present policy, discarded data collection after it was determined that it served no useful purpose to the Navy or DOD. It was his impression that DOD's program has not benefited Navy attainment of self sufficiency from contractor furnished engineering and technical services.

The Army's program for implementation of the DOD directive is obscure. Representatives have been unable to convey to the Investigative Staff methods by which the Army is in complicance. A portion of the Army effort has been delegated to the Army's Material Development and Readiness Command (DARCOM) as the "Logistics Assistance Program (LAP)." Under this program DARCOM diligently collects statistical data on contractor supplied engineering and technical services, but the information is not all encompassing. As an example, DARCOM program managers as of March 31, 1981, identified 24 contract personnel within the purview of LAP, but at the same time 256 others were performing similar functions and they were excluded. As a further example, the Investigative Staff noted that 218 contractor personnel were supporting DARCOM's

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Missile Command (MICOM). However, DARCOM placed only 23 in LAP. It remains unclear how the Army accounts for the remaining 195 MICOM contractor personnel.

DOD, concerned with inadequacy of policy governing civilian technical assistance, contracted with the Logistics Management Institute (LMI) to perform a study of the matter. The results reported in July 1980 analyzed the extent of military compliance with DOD directive 1130.2. It was reported that approximately 4,500 in-house and contractor civilians provide technical assistance to U.S. Forces in CONUS, overseas, and aboard Naval ships. This support, according to LMI, is regarded by the military services as indispensable in sustaining material readiness of front line weapons systems.

The majority of information collected by LMI was judged inconclusive due to the military services noncompliance with the directive. The most significant LMI finding was the lack of DOD policy governing use of civilian technical assistance in wartime. The report criticizes DOD's assumption that the military services can achieve self-sufficiency within an arbitrary period when, in fact, self-sufficiency has not been achieved--even on pre-Vietnam weapon systems.

DOD, seeking to rewrite directive 1130.2, directed the Defense Audit Service (DAS) to evaluate the deficiencies uncovered by LMI. DAS, in preliminary findings, discussed the total engineering and technical services (ETS) program as a $200 million annual enterprise. DOD guidance was criticized as too general, resulting in overall lack of control, visibility, and coordination. DAS criticized the failure of DOD to include all ETS categories in its directive, specifically hands-on technical assistance, and criticized the reporting mechanism for failure to include all ETS personnel. The DAS investigation, like the LMI inquiry, disclosed numerous examples of improper and inadequate reporting in the ETS program.

Contractor Technical Representatives in the Field

The Investigative Staff has encountered situations in the European theater where contractor supplied personnel are integral to training, supply, and maintenance of front line military equipment. There are also situations where military units in CONUS, designated for rapid deployment, include contractor personnel in deployment plans.

The U.S. European Command has identified 1,028 contractor supplied technical positions assigned in-theater, which are considered critical to military operations. The potential for replacing these civilians with military personnel in time of war varies according to position but some functions could suffer 100 percent degradation. Those activities which could be most affected include command and control communications;

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air defense equipment, radars, and missiles; tactical missile systems; aircraft and avionics maintenance; and various computer operations.

The tabulation of critical civilian positions compiled by the European Command did not attempt an assessment of all contractor supplied services and the total number of contractor personnel performing in the European theater is unknown. The Investigative Staff during visits to military units was apprised of the critical services performed by contractor personnel in training and hands-on maintenance. It was the consensus among military professionals that the military services lack sufficient numbers of qualified military personnel to maintain the ever increasing sophisticated equipment used in modern weapons systems. However, there is a parodox; it was discovered that many Army personnel skilled in weapons operations and maintenance are assigned to unrelated tasks. These situations are created by a host of circumstances associated with Army regulations.

At a HAWK air defense missile site in Germany, the Investigative Staff was told that three experienced launch crew chiefs had been reassigned to other duties unrelated to their job skills. One works as a truck driver-courier; one as training officer/mail clerk; and the third as company clerk. Similar situations were encountered at a weapons maintenance facility where 10 personnel trained in weapons maintenance were working in libraries, bowling alleys, gymnasiums, and driving buses.

The HAWK air defense missile system which has been deployed in Germany since the 1960's provides insight to the varied and extensives services provided by contractor supplied technicians. The HAWK equipment is subject to five maintenance levels. Four levels are performed by military personnel in the field and the fifth at contractor plants in CONUS. This is supplemented by a contractor operated "Hawk Project Field Facility-Europe" (Hawk facility) located in Germany. Work at the facility includes field engineering services (training and hands-on maintenance); equipment modernization; data collection for improved logistics support; intensified supply management; and product improvement, a program which includes heavy maintenance, training and technical assistance to improved systems. At present the HAWK facility employs 83 contractor personnel performing under 7 separate contracts valued at $9 million.

Army civilian personnel and contractor personnel associated with the HAWK facility were unanimous in their contentions that work performed by the facility in product improvement, modernization, and maintenance, is beyond the capability of most military technicians. In the event of war, the HAWK facility manager would offer his employees the opportunity to leave, but he believes many would stay for continued support of the military.

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Investigative Staff Observations

The Investigative Staff questions several operations performed by the HAWK facility as unnecessary or excessive. it was noted that major HAWK components under repair at the facility painted in camoufalage, are repainted Army green before being returned to units, where they are repainted in camouflage. Contractor and Army civilian personnel on site agreed that the process is wasteful and unnecessary. It is unclear how the procedure got started but Army and contractor personnel claim they have been unsuccessful in convincing the Army Missile Command to discontinue the practice. The cost of painting ($23,000 for 88 items over a 2-year period) is negligible in comparison to total contract costs, but it is also absolutely unnecessary.

Other questionable contractor services involve sample data collection for improved logistics support (four people, $260,000 annually); and contractor assistance for the return of items to CONUS for repair. Contractor personnel admit that the data collection function requires no specific contractor expertise and could be assumed by the military. The return for repair function utilizes the services of two contractor personnel and two theater transshipping points. An Army representative has been unsuccessful in changing this to a more practical and less expensive procedure utilizing one contract employee and a more direct shipping route.

The foregoing sample of programs associated with contractor supplied engineering and technical services suggests that all such services are not mission essential, that abuses do exist, and the programs are loosely controlled by the DOD and military services. However, there is substantial evidence that many of the services provided by contractors are directly related to readiness and are nonreplaceable. In such situations the DOD has not adequately provided for the continuation of these services during wartime. Recent proposals being evaluated by the DOD, in a sense, capitulate to the military's inability to adequately train its personnel to maintain modern weapons systems. DOD is considering several alternatives which would place civilians holding essential positions in combat zones under military control during wartime. The alternatives include extending the code of military justice to cover certain civilians and awarding contracts calling for voluntary enlistment into the selected reserve during mobilization.

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A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense was asked to comment on the report and his response for the record follows.

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RESPONSE

OASD (MRA&L) has begun an effort to revise DOD 1130.2 which deals with the engineering and technical services program. The revisions will include elements of the LMI study and the DAS reports cited. We expect to have revisions available for coordination within six months of the formal issuance of the DAS reports.

One finding suggested that the Services lack sufficient number of qualified military personnel to maintain the ever increasingly sophisticated equipment used in modern weapon systems, yet paradoxically, many Army personnel skilled in weapons maintenance and operations are assigned to unrelated tasks. The situation does exist to some degree. Understaffing requires that military manpower be borrowed to fill positions not directly related to their job skills. However, the Army is now striving to correct this situation. Efforts are being made to expand the civilian work force. The Maintenance Management Improvement Program (MMIP) is being utilized to educate maintenance leaders to better utilize the resources available to them.

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Report of September 23, 1981

THE TRAGIC STATE OF DOD WEAPON SYSTEMS PROVISIONING FOR OTHER THAN INITIAL SPARES

Post initial provisioning reviews are not being conducted as required by regulation. As a consequence, there is a severe shortage of spare parts and cannibalization has become a way of life in the field. Provisioning abuses by DOD procurement officials have also contributed to the shortage of spare parts.

The military services maintain inventories in order to furnish requested material within specified leadtimes and to meet surge mobilization requirements when an emergency requires it. With needed inventories on hand at depots, the customers (using organizations) do not have to wait for their needs to be satisfied by a manufacturer. Since the inventory manager's mission is to satisfy the customer's request in a timely manner, he must place orders with the manufacturers and receive the material in advance of customer's requests. To do this, the inventory manager must be able to forecast customer's future needs or requests.

The most accurate method of forecasting these requirements is to know which items in what quantities have failed or were needed in the past--historical evidence or prior experience. As long as the same systems remain in use and perform like functions or missions in similar environments, requirements to support them in the future will statistically approximate prior experience.

When new weapon systems are brought into the military services, spare parts must be procured and placed at the various organizational levels to support those systems during their initial deployment. The range and quantities of the new spare parts in most instances are determined on the basis of engineering or other technical estimates, since past requirements experience is not available. This process is known as initial provisioning.

Provisioning Phases, Wide Variations With Appropriations Impact

DOD defines provisioning as the management process for determining and acquiring the range and quantity of support items necessary to operate and maintain an end item of material. The provisioning process is divided into two phases, initial and replenishment. For the initial phase, spare parts are acquired to support a quantity of systems through an initial support period which is established by the military services. This period is to cover the time needed to determine operational failure and demand rates for the systems' spare parts. Its principal objective is to assure the timely availability of minimum initial stocks of support items at using organizations and at maintenance and supply activities to sustain the programmed operation of a weapon system

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until normal replenishment can be effected. For the replenishment phase, spare parts are acquired to (1) support the system delivered following the initial support period, (2) replace parts that cannot be repaired, and (3) adjust the quantity of spare parts as required by changes in system reliability, support policies, and/or programmed activities.

Required Reviews

DOD directives state that after an item has been used in an operational environment for 2 years, the use of estimated factors is prohibited. They also state, each responsible organization will maintain a 2-year history of part numbers, and stocked and nonstocked item requisitions received by the inventory control managers for the purpose of identifying for review and possible stockage of those items which subsequently meet DOD stockage criteria on the basis of actual demand.

In the Army, this subsequent determination of the range and quantities of items to be included in the inventory for support of additional systems operationally introduced is supposed to be based on a "post provisioning review." This review is to be conducted 12 to 18 months after initial deployment of a weapons system which begins the Demand Development Period (DDP). It is to be a validation of the adequacy and validity of selection of the range and quantity of spare parts made in the initial provisioning. Furthermore, this review requires that revisions to the initial provisioning be made as expeditiously as practicable.

Reviews Generally Not Made as Required

In general, the military services have not been determining their requirements for spare parts subsequent to initial provisioning--during the DDP--on actual failure/demand rates.

DOD guidance provides that, except for unusual circumstances where temporary conditions have caused past demands not to be indicative of the future, actual demand data will be given increasing emphasis during the DDP. This is expressed as the weight to be given to actual data in calculating requirements:

	Minimum Weight
POC* date plus 6 months	0
POC plus 6-12 months	.25
POC plus 12-18 months	.50
POC plus 18-24 months	.75
POC plus 24 or more months	1.00

*POC = Preliminary Operating Capability

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Using the above criteria, the military services should be using actual data for computing requirements at 24 months of experience after initial deployment and thereafter.

The Army's Blackhawk helicopter was first fielded in October 1978, however, the Army indicated its DDP would run from November 1979 to January 1982. The Army has been using contractor support and has received very little operational demand data for the spare parts needed to support this system. The Navy plans to assume supply support responsibilities from the contractor for the F/A-18 aircraft in October 1982 and only then will it begin its DDP. This is approximately 2 1/2 years after the first aircraft became operational.

As a result, actual operational demands will not be used completely to compute requirements for spares to support these Army and Navy systems for approximately 4 years after their initial deployment. These years are arrived at by computing the time frame from the date of first delivery (to a unit for operational use) to 2 years after the service planned date of beginning its DDP. The rationale for using actual operational data as soon as possible is evident from the failure rates experienced by the Air Force for the F-16.

The Investigative Staff learned that for F-16 initial spare parts, the Air Force actual experience ranged from 74 percent less than that predicted to 147 percent more than the predicted failure rates in flying hours. For example, accelerometer assemblies had a predicted operating time of 2,100 flying hours before failure, however, in actual experience these assemblies were failing after 543 flying hours. Conversely, the pneumatic sensor assemblies which had a predicted operating time of 382 flying hours before failure, in actual experience were not failing until after 945 flying hours. Data for 30 F-16 spares showed that 17 had actual experience greater than and 11 had actual experience less than their predicted failure rates. For the other two F-16 aircraft, the predicted and actual failure rates were very close. Granted, this is a limited amount of data, however, it indicates that the predicted and actual failure rates were close in only 6.6 percent of the cases.

In response to inquiries by the Investigative Staff, the Tank Automotive Command (TACOM) identified two vehicles on which it had conducted post provisioning reviews after they had been fielded for 3 and 4 years. The vehicles reviewed were the GOER family (M520, M553, and M559 trucks) and the M911 truck-tractor Heavy Equipment Transporter (HET). These reviews showed 10 percent of the GOER and 20 percent of the HET repair parts required changes in the failure factors being used. These reviews were begun 1 and 2 years after the computation of required support was, according to OSD policy, supposed to be based 100 percent on actual demand.

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In its March 19, 1980, report on Repair Parts Provisioning at the Army Missile Command (MICOM), the Army Audit Agency disclosed that provisioning reviews were not being made to determine whether the kinds and quantities of repair parts supplied to support past deployments of the end items were correct or should be revised for use in future deployments. Army Regulation 710-1 provides that when the extent of failures, as shown by the number of demands for a part, varies from the initial failure factor used for initial provisioning estimates, a review should be made to determine the causes and adjust the estimates to be used in the future. Army Audit stated significant differences existed between estimated and actual failure rate for over 15,000 repair parts. Furthermore, the Army Audit Agency found 23 of 100 highly demanded repair parts were not even listed on the support list allocation cards. These cards identify the items and quantities estimated to be needed for support during the initial deployment period.

The report stated, because most failure factors were not reviewed and updated as required, there was no assurance the range and quantity of repair parts and components to be provided on future deployments of the same weapon systems would be corrected.

OSD has stated that present policy allows for the transition to use of actual experience in the requirements computation and this transition should be made as soon as possible, with a maximum allowable time of 2 years. Discussions with DOD officials indicate although this is the stated policy, OSD has no management controls, other than internal or GAO audits, to effectively ensure the policy is carried out as intended. These discussions also indicate the use of contractors for initial and subsequent support of weapon systems and for accumulation of failure data and demand rates is believed to meet the OSD policy. It may be a means of complying with the OSD policy, however, Army officials informed the Investigative Staff that, in their opinion, the accuracy and reliability of data furnished by such contractors frequently cannot be depended upon for making projections of future needs.

Increase in Costs Not Ascertainable

Because of (1) the manner in which the budget for spares support is developed and (2) the lack of visibility of the total costs of spares support for new weapon systems procurement, it is impractical to readily identify the increased costs that result from the military services' failure to base forecasted requirements on actual demands experienced within 2 years of the preliminary operational capability date.

Estimated spares for support during the initial deployment period of new weapon systems are supposed to be budgeted for as part of the annual procurement request and identified as initial spares. However, spares estimated for support of other new weapon systems being deployed after the initial period are combined with replenishment requirements. Furthermore, the services do not use the same period of time in budgeting for initial spares support

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for new weapons. For example, the Air Force budgeted F-16 initial spares support for only the first 2 years of deployment; the Navy, because of contractor maintenance support, plans to fund requirements for the F/A-18 as initial spares for a period of 4 years; and the Army, which is using contractor support for the Blackhawk helicopter for the first 4 years, will be funding support for the first 6 years of deployment as initial spares.

Cannibalization, a Way of Life for Service Maintenance Programs

The procurement of new weapon systems has eroded the support base for on-line weapon systems, causing critical shortages of spare parts and reducing mission capabilities in the European theater. Increasing cannibalization rates and growing numbers of "hangar queens" are now acceptable operating procedures necessary to maintain a mission capable posture. These methods affect not only sophisticated weapon systems, but support vehicles maintained by off-the-shelf items.

Cannibalization and Hangar Queens--Short Term Solutions

Cannibalization is the selected and controlled removal of a spare part(s) from one piece of equipment in order to make another piece of equipment mission capable. Cannibalization is a short-term fix. It is extremely expensive in terms of man-hours, because the part must be removed and replaced twice instead of just once. Because a good part may be damaged during removal, the overall spares requirement generated by cannibalization will be more than one-for-one in the long run.

"Hangar queen" is the term applied to a piece of equipment that is deadlined and then "plundered" of its parts to make another piece of equipment operational. Any aircraft deadlined more than 21 days because of the lack of spares is designated a "hangar queen."

The services are concerned over cannibalization and "hangar queens." The pressure of maintaining a high readiness posture and the failure of the logistics system to provide critically needed spares, has forced cannibalization combat units. It is a very expensive proposition when seven aircraft, costing $20 million each are on "static display" due to lack of spare parts (some costing as little as $5).

The A-10 Aircraft is Close to Being an Unsupportable System

On July 29, 1981, the 81st Tactical Fighter Wing at Bentwaters, England, should have had 27 out of its 108 A-10 aircraft deadlined due to the lack of spare parts. This condition was avoided by the cannibalization of some of the deadlined aircraft in order to make others mission capable. The cannibalization rate on the A-10

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for June 1981 was 9.7 percent for each 100 sorties flown. This resulted in three "hangar queens" with four more aircraft approaching that status. Sixty percent of the parts used to repair grounded aircraft were obtained as the result of cannibalization in order to satisfy spare part shortages. In June 1981, there were 239 acts of cannibalization on the A-10's at Bentwaters.

The A-10's problems are compounded by serious problems with the engine. The engine, which is a General Electric TF34-GE-100 turbo-fan engine (two per aircraft), was an off-the-shelf buy. It was not tested for the close combat support mission of the A-10 aircraft. As a result, power loss has been experienced which has been traced to an inadequate seal on the engine. This item is in short supply. As of July 29, 1981, there were 151 parts on order for 22 spare engines, 75 of the parts on order were the result of cannibalization. A senior maintenance noncommissioned officer (NCO) told the Investigative Staff that the A-10 "is close to being an unsupportable aircraft," due to the shortage of spare parts.

Ten Percent of the F-111's
Are "Hangar Queens"

At the 48th Tactical Fighter Wing, Lakeheath, England, 7 of the 74 F-111 aircraft assigned were classified as "hangar queens" with 2 more of the aircraft fast approaching the same status. The F-111 has been operational since the early 1970's with a life expectancy to the year 2000. Yet, critical parts shortages have severely reduced its operational capabilities. Twenty different parts are not in supply. Some will not be available until 1982.

The F-15 Flies with Intensive
Management of Spares

The F-15 tactical fighter, which is still in production, requires intensive management of spare parts at the base operational level to keep the plane mission-capable. The 36th Tactical Fighter Wing at Bitburg, Germany, has experienced high cannibalization rates and increased numbers of "hangar queens." Only intensive management requiring a large amount of manpower and time have kept their rates from rising to even higher levels. A 24-hour operation involving officers, NCO's, and airmen, continuously monitors and traces the shipment of vital spare parts needed to maintain minimal operational readiness levels. These individuals spend all their time searching for spare parts in a supply system designed to provide responsive support but is not doing so!

Army Helicopters--Serious
Deficiency of Engine Spares

A lack of spare parts for helicopter engines has reduced the operational efficiency of Army helicopter units in Germany. The majority of the helicopters (AH-1, UH-1, OH-58, CH-47) have engines manufactured by AVCO-Lycoming, which has been unable to

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produce the necessary spares. The Army has instituted the Aviation Intensified Managed Item (AIMI) list for those critical spares. This list now has 104 items and continues to grow. Some items on the AIMI list can only be ordered when one fails. No stockage is authorized. Order-ship-time on these items is now 28 1/2 days. The manufacturer of the engines, AVCO-Lycoming, has apparently overcommitted its production facilities since it is now producing the engine for the M-1 tank.

M-730--Tracked Vehicle Detracts From CHAPARRAL Effectiveness

The M-730 is a tracked vehicle designed to transport the CHAPARRAL missile. The CHAPARRAL provides air defense protection for bases in Germany. The effectiveness of the CHAPPARAL depends on its mobility which is provided by the M-730. According to CHAPARRAL maintenance personnel, the M-730 is unreliable and has serious maintenance problems compounded by a critical shortage of spare parts. While they have little trouble in maintaining the missile and its related systems, the shortage of spare parts has made the M-730 a serious problem. The Investigative Staff was informed that in order to meet mission requirements, it is not uncommon to tow the M-730 into field positions.

Spare Parts for a Dodge Pickup are Lacking

While parts shortages might be expected in connection with certain new, complex, and sophisticated weapon systems, it is difficult to imagine that a Dodge pickup (M-880) cannot be maintained. Senior maintenance personnel advised the Investigative Staff that it is becoming impossible to obtain parts for this basic Army carry-all and also for the M-915 5-ton truck tractor. The short supply items include transmission seals and parts for this body frame. The trucks that are operational are kept running only by the cannibalization of parts from those that are not running.

The Improved HAWK--
Zeroed Out by One Part

The U.S. Army Missile Command instituted an intensive upgrading of the HAWK missile at a great expense. However, many pieces of equipment were accepted by the Army from the manufacturer without independent testing of their performance. One such item was the A-7 circuit card, a critical item in the HAWK system. This item was accepted from the contractor with his quality assurance for a low failure rate. When the Improved HAWK went operational in Germany, this circuit card failed, causing additional failures and placing one HAWK battery at a zero operational rate. While the battery is now operating at a higher level of readiness, the A-7 circuit card is still a critical item in short supply and subject to repetitive failure.

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New Weapon Systems Erode Support of Older Systems

While most DOD procurement and logistics officials point to the eroding production base as the primary reason for the shortage of spare parts, the procurement and production of new systems could well be a major contributing factor. On the procurement side, there is greater glory in purchasing a new weapon system than the nuts and bolts to keep older systems working. There are more dollars and profit in the manufacture of a major system than in the production of spare parts. Whenever a major system is procured and produced, an older system declines in reliability. The following chart demonstrates this relationship.

Manufacturer	Older System	New System
AVCO-Lycoming ----	T-53, T-55 Helicopter engines	M-1 tank engine
General Dynamics -	F-111	F-16
McDonnell-Douglas-	F-15	F/A-18
General Electric -	TF34-GE-100 engine (A-10)	Numerous new engines
FMC Corp. --------	M-730 carrier	Infantry Fighting Vehicle Cavalry Fighting Vehicle Landing tracked vehicles

These are only some examples of situations noticed during a recent Investigative Staff visit to Europe. The production of new weapon systems is primary, the support of existing systems is secondary. Replenishment of spares takes a "back seat" to getting new weapon systems deployed to field units. This problem can be demonstrated even with new weapon systems. For example, the F-16 aircraft, one of the newest weapon systems in the inventory is experiencing a growing cannibalization rate of 1.5 percent per 100 sorties and maintenance personnel estimate that it will soon reach 30 percent per 100 sorties.

Provisioning Abuses Contribute to Parts Shortage

While many DOD officials point to a declining industrial base as the cause of the shortage of spare parts, the DOD provisioning procedures are also a major cause for this situation.

An Air Force report on F-15 provisioning contracts shows an apparent large-scale abuse of the provisioning system. Warner-Robins Air Logistics Center (WR/ALC) is continuing to use McDonnell Astronautics Company (MCAIR) as a "parts warehouse." The report states that, "the current system of continual reprovisioning is similar to a 7-11 convenience store operation."

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A review of the parts purchased for the Air Force's F-15 on the initial provisioning contract as well as the current replenishment provisioning contract generated a parts list 237 pages long. It showed that not only were the same parts being provided for on both provisioning contracts, but that items are being procured numerous times on the same provisioning contract.

The list also showed a large volume of orders for a small quantity of items (clearly an uneconomical practice). Some of the procurements were less than $20. The administrative cost to place such orders frequently exceeds the cost of the procured item itself. The Air Force report recommended consolidation of the orders to cut administrative costs.

A more "subtle effect" of this reprovisioning process is that during a 4-month period, two-thirds of the orders received at MCAIR on one contract were Non-Operational Ready-Supply (NORS) items. The report indicated that this was, "a symptom of poor planning and must be having a significant impact on the operational readiness rate."

WR/ALC responded to this report by advising, "we do not intend to change our procedures on ordering F-15 spares in the foreseeable future." WR/ALC sees, "no other way to effectively support the F-15 when the aircraft is down for parts."

Investigative Staff Observations

The Investigative Staff has found that a serious lack of spare parts has degraded the operational readiness status of DOD's weapon systems. This tragic state has resulted from the military services' mismanagement of the provisioning, procurement, and budgetary processes. The military services must shoulder the blame themselves. Their failures to (1) conduct the required post provisioning reviews, (2) respond to documented provisioning and procurement abuses, and (3) develop accurate requirements for spare parts, have jeopardized the readiness of front-line weapon systems. Operational units have been forced to resort to cannibalization to produce the needed spares to maintain their readiness posture. This has necessitated an increase in the number of "hangar queens" that are not operational after having been plundered for spares.

The Investigative Staff believes that DOD should direct the military services to (1) conduct timely post provisioning reviews at the required time; (2) institute procedures to eliminate provisioning and procurement abuses; and (3) provide the Congress with precise and fully supportable requirements for weapon systems spare parts.

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A summary of this report was included in the FY 1982 Defense Appropriation Hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

The Investigative Staff report stated that the Military Services generally were not using actual failure/demand data for requirements projections during the Demand Development Period (DDP), and recommended that post provisioning reviews be conducted to correct this problem. We concur with the report that actual usage data should be considered during the DDP; and, as the report points out, it is DOD policy that this be done. To assure adherence to this policy in the future, we plan to address this issue when reviewing the Integrated Logistics Support Plans for individual weapon systems.

The Investigative Staff reported that duplication or overlapping requirements through multiple contracts are resulting in inefficient procurement practices. DOD Directive 4140.40, "Basic Objectives and Policies on Provisioning of End Items of Materiel," is currently being revised to require that consideration be given to ordering selected s are and repair parts concurrent with the ordering of identi l items being procured/manufactured for the production model end items. This policy statement should help to alleviate some of the "piecemeal" contracting pointed out in the Report.

The Investigative Staff report recommended that DOD provide the Congress with precise and fully supportable requirements for weapon systems spare parts. There is a two-fold effort underway in this area: (1) we are redefining the term "initial spares," for budget purposes, in order to make more visible the cost of fielding a weapon system; and (2) we are continuing to develop a capability to relate decisions regarding spare parts stockage locations and quantities to their effect on weapon system readiness through the use of multi-echelon inventory modeling. We believe the culmination of these two efforts will satisfy the intent of the Investigative Staff recommendation.

The report cited the Blackhawk helicopter as a system for which post provisioning reviews have not been conducted and inferred that this was normal Army practice. The Army does, in fact, conduct post provisoning reviews whenever validation of initial provisioning decisions promises a potential payoff. HAWK and PERSHING are examples. Post provisioning conferences are not conducted on systems where meaningful results will not be obtained. However, the Army has taken action to improve availability of aircraft spares. Management initiatives include the incorporation of production leadtime data from major vendors into the Army's requirements determination system. This permits the Army to better keep pace with the rapid changes in today's aerospace

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industry. Another example is "line of balance" reviews with major contractors to insure that scheduled deliveries are commensurate with Army requirements. The aircraft spares situation is expected to improve. Additional requirements have been identified and are funded in the FY 1982 and FY 1983 budgets.

As pointed out, AFLC regulation 65-5 requires our System Managers (SM) and Item Managers (IM) to conduct Initial Spares Support List (ISSL) reviews for all "Second Wing" (and subsequent) activations when new weapon systems enter the Air Force inventory. Experience gathered from "First Wing" activations is reviewed by SMs/IMs and becomes the basis for revising ISSIS for the second wing. This process is repeated for each subsequent activation. SM/IM reviews continue as the system matures, with the goal of assuring that follow-on replenishment requirements are computed using actual usage data.

We have traditionally had spare parts shortages and frequent cannibalizations on relatively new weapon systems such as the A-10, but we do not attribute this to failure to conduct post initial provisioning reviews. Usually such shortages are the result of unanticipated demands caused by failure rates exceeding early estimates for new items and frequent design changes to correct these excessive failure rates. In addition, to achieve maximum stock availability for any given level of funding, safety levels on expensive items are deliberately sacrificed to assure an adequate safety level on less expensive items. This improves overall response in filling requisitions but, in a fund-constrained environment, tends to perpetuate shortages of the expensive items.

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Report of September 23, 1981

INVENTORY CONTROL PROCEDURES AND PRACTICES

Introduction

The Committee directed a review of inventory control procedures and practices to determine whether these practices enable military personnel to know what supplies are on hand and at what depot. This section describes various procedures used by DOD for supply management purposes and concludes that millions of dollars could be saved by cancelling requisitions for material no longer needed by the military services.

The Federal Catalog System Provides Users with Vital Information

The Federal Catalog System is a fundamental tool for improving the efficiency of supply management operations within and between all the military services and civil agencies of the Government. The objectives are to:

-- Establish a single Governmentwide item identification language.

-- Provide accurate item identification data.

-- Record sources for items of supply.

-- Record Government managers and users for each item of supply.

-- Furnish logistic related data to all Government organizations.

The system applies to all items of supply which are controlled and subject to central inventory management, reporting, and distribution in the supply systems of the military services, Defense Logistics Agency (DLA), civil agencies including the General Services Administration (GSA), the North Atlantic Treaty Organization (NATO) and other foreign nations under foreign military sales cases.

DLA's Defense Logistics Services Center (DLSC) in Battle Creek, Michigan, is the central control and monitoring point for the Federal Catalog System. DLSC is responsible for the preparation of handbooks, manuals, item identification lists and guides, master files and cross reference lists, pertaining to the system. It also processes item identifications and related management data, assigns National Stock Numbers (NSN's), and maintains complete master data files on all NSN's--the Master Federal Supply Catalog.

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The military services, DLA, and GSA are charged with responsibility for developing item identifications and related data and furnishing this information to DLSC. This responsibility has been delegated to the item managers in military and civil agencies and military services supply centers, hereafter referred to as Inventory Control Points (ICP's).

Item identification includes a uniform name and a description of the item of supply. There are approximately 29,000 uniform approved item names, and these are published together with their definitions in the Federal Item Name Directory. This directory also lists colloquial names, including names used by industry, which are crossreferenced to approved item names. The item of supply is further defined by description of its characteristics. This description may be narrative to depict essential characteristics, i.e., physical, mechanical, electrical, etc., or by reference to the item's identifying numbers and supporting technical data, such as part numbers, and blueprints. The ICP's also develop and advise DLSC as to the price of the item and who the users are.

DLSC will assign a 13-digit NSN for each item of supply. Thus, one name, one identification description, and one stock number apply to each different item of supply. The NSN is structured to provide for grouping of related items, classification within a group, country identification, and specific item identification number. For example, the NSN 5303-01-123-4567 could be assigned to a particular type of screw; 53 is the group code for hardware and abrasives, 03 is the class code for screws, 01 is the code for the United States, and 123-4567 could be the number assigned to the particular type of screw. Therefore, the 13-digit NSN will be the only number used to identify that item (and no other item) in all material management functions. If, however, the item is four-digit class code would change but the last nine digits, referred to as the National Item Identification Number (NIIN), would remain with the item as long as the item exists in the system.

Data collected by DLSC are available on a subscription basis in punched cards, microfilm, microfiche, as well as book-type catalogs and include total system or partial data tailored to classes of items. Thus, worldwide customers will know what the item is, what the item does, what stock number to use, what the unit price is, and where to submit requisitions for the item.

Currently, there are about 6.5 million items of supply managed by and assigned to the various ICP's, of which about 4 million are active.

Receipt of Supply Status
Varies Widely Between Services

The Investigative Staff interviewed personnel at numerous requisitioning units in Europe to determine how long it takes to receive supply status for an item once a requisition is submitted

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to an ICP. The responses varied widely by service as illustrated below.

Issue Priority Group	Supply Status Response Times		
	Air Force	Navy	Army*
	(days)		
I (Urgently needed) ---------	1	1	No response
II (need immediately) --------	2	9	No response
III (routine replenishment) ---	3	12-15	No response

* The U.S. Army in Europe subscribes to a "data suppression program" in which supply status information is kept from the requisitioner so that he will not be innundated with supply status cards.

The Army's "data suppression program" results in the requisitioning unit frequently receiving the material before they receive advice on the status of their requisitions. This problem is further compounded by numerous types of requisition reconciliations which take place. This problem is discussed in the next section.

DOD Should Adopt Revised Procedures to Validate Outstanding Requisitions

Introduction

DOD and the military services have established procedures for reconciliation and validation of outstanding requisitions. The purpose is to identify requisitions for supplies and materials no longer needed. These procedures are inconsistent, overlapping, and duplicative and they have not been effective. As a result, requisitions for material no longer required have not been cancelled and, conversely, valid requisitions have been erroneously cancelled--seriously delaying the receipt of needed supplies by combat units.

The Investigative Staff interviewed numerous officials at various DOD levels, evaluated the procedures at pertinent headquarters and field locations, and reviewed numerous related GAO, DOD, and military service audit reports. The Investigative Staff concluded that a single standardized DOD-wide procedure duly implemented and effectively monitored would provide more effective validation and result in more timely and accurate cancellation of requisitions for material no longer required and prevent the cancellation of valid requisitions, thus materially improving DOD's readiness posture.

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In July 1967, DOD initiated the Material Obligation Validation (MOV) process in accordance with Chapter 7 of DOD Instruction 4140.17-M. The purpose of this process is to obtain users' validation of the continuing need for certain overage requirements requisitioned but still unfilled and for the reconciliation of records for such requisitions between the Inventory Control Points (ICP's) and the requisitioning activities. Specifically, the procedures should insure the (1) validation of need and (2) reconciliation of records. It was necessary to initiate this process, generally referred to as "top-down," because requisitioning activities had not promptly canceled such requisitions when the requirement no longer existed and there were wide differences between the units' records and those of the ICP's.

Current DOD Material Obligation Validation (MOV) Top-down Procedures

The general rules (Chapter 7 of DOD Instruction cited above) state that the process will be performed quarterly on the following basis:

MOV VALIDATION SCHEDULE

Cycle No.	Cutoff date for preparation of MOV requests by ICP	Last date for requisitioner response to ICP
1	January 20	March 5
2	April 20	June 5
3	July 20	September 5
4	October 20	December 5

Requisitions subject to the MOV process include those coded with the issue priority designators 1 to 8 (needed on a priority basis) which have aged 30 days past the requisition date and those coded with the issue priority designators 9 to 15 (routine replenishment) which have aged 75 days past the requisition date. Requisitions for which responses have not been received by the cutoff response date are supposed to be automatically canceled by the ICP for those activities having access to the Automatic Digital Network (AUTODIN); however, deployed units which are unable to respond by the cutoff response date (due to lack of communications and computer capability) may request temporary suspension of cancellation action until such time as the appropriate Fleet Type Commander (or other responsible commander) furnishes an estimated date as to when the unit will be able to give the required response. Also, to help mitigate any adverse effect of automatic cancellation, Defense Logistics Agency (DLA) ICP's have stopped automatic cancellation of requisitions in a direct vendor delivery status.

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The processing begins at the ICP's which generate the requests for validation for the requisitions to be reconciled/validated. These request cards are submitted by the ICP's to the Defense Automatic Addressing System (DAAS) via AUTODIN. DAAS must, within 5 days, submit the request cards to the requisitioner. This is done via AUTODIN or by mail to those requisitioners not having access to AUTODIN, e.g., some ships at sea or remote units. When sent by mail, the cards are interpreted (the data are printed on the card) and accompanied by a listing, if required.

Requisitioners are to acknowledge receipt of the requests and to compare the requests with their records of unfilled requisitions to determine differences and take actions to bring the two records into agreement.

Requisitioning activities are to conduct an item-by-item review with the end-user to determine the continued need. Also, they are to submit responses containing cancellation as soon as possible to avoid filling of requisitions for items no longer needed. ICP's are to take all feasible actions to preclude shipment from the depot, port of embarkation, or the vendor.

Each military service and agency headquarters is to submit a report on the quarterly MOV within 30 days after the close of the cycle. Summarized below are the reports for calendar year 1980.

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MOV REPORTS
CALENDAR YEAR 1980
(000 Omitted)

	Total Validation Request		Cancellation Requests from Validation		Actually Cancelled as Requested		Percentage (5-3)	(6-4)	No Response		Cancelled Due to Nonresponse		Percentage (11-9)	(12-10
	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollar
ARMY	1,057.1	$32,533,588	112.1	$2,607,169	58.9	$1,471,092	52.5	56.4	5.3	$ 75,009	4.0	$ 56,618	75.5	75.5
NAVY	657.4	1,708,947	44.5	126,104	32.5	106,147	73.0	84.2	37.3	111,626	26.6	89,255	71.3	80.0
AIR FORCE	817.0	6,126,634	2.1	a/	2.0	3,036	95.2	a/	49.7	171,670	49.2	169,015	99.0	98.5
MARINE CORPS	28.3	12,169	3.0	1,404	1.5	321	50.0	22.9	2.2	598	1.4	206	63.6	34.4
DLA	1,225.1	848,524	86.6	42,901	38.5	21,800	44.5	50.8	211.5	133,772	35.9	37,810	17.0	28.3
TOTALS	3,784.9	$41,229,862	248.3	$2,777,578	133.4	$1,602,396	53.7	57.7 b/	306.0	$492,675	117.1	$352,904	38.3	71.6

a/ The addition to the total of the Air Force figure (if it were known) to column 4 would alter the result only insignificantly.

b/ Computed as shown from total figures in columns 4 and 6.

Military Service Procedures

Each of the military services has published procedures to implement the above described "top-down" DOD-wide MOV procedures. In addition, each service has established other intraservice reconciliation and/or validation procedures with varying degrees of consistency, overlap, and duplication as described in the sections belc .

A y Procedures

The Army has established a monthly reconciliation/validation process. Direct Support Units (DSU) create a listing or validation request cards for all open requisitions, regardless of age or ICP source of supply, for those units it supports. The units reconcile their records with the listing received from the DSU and are supposed to verify with the ultimate user that the material is still needed. The listing or cards are annotated to show continuing need or requested cancellation and then are sent back to the DSU. The DSU takes necessary action to effect cancellations requested and other follow-up actions. The reconciled/validated requisitions are then matched with the records at the Corps or installation level. In turn, the Corps or installation level records are adjusted with the records of the Logistics Information File (LIF) maintained by the Logistics Control Activity (LCA) at Presidio, California. LCA then issues necessary follow-ups to the ICP's.

When units do not respond to the DSU's request for reconciliation/validation, current procedures do not require automatic cancellation, but under proposed Army changes, the new procedure will be to require follow-up and the appropriate commander will be advised of the nonresponse; in this case the unit's requisitions will not be automatically cancelled. If the unit fails to respond during the next monthly cycle, however, its requisitions will be cancelled.

Air Force Procedures

The Air Force top-down MOV process excludes intra-Air Force requisitions (Air Force user to Air Force ICP) because reconciliation of intra-Air Force requisitions are required to be performed during the Air Force quarterly bottom-up process, as described below. It should also be noted that the top-down implementing instructions do not specifically require validation down to the ultimate user, i.e., it is a records reconciliation process rather than a reconciliation/validation review. For example, an Air Force base supply activity does not notify each of its customers of the need for validation; rather, the base supply's records are used as the basis for the MOV.

As noted above, the Air Force has established a quarterly bottom-up reconciliation process and also has established a monthly "due-out" reconciliation/validation procedure and a biweekly in-line

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follow-up process. The Air Force is also conducting a test to determine whether the bottom-up process should be eliminated.

Bottom-Up Process

The quarterly bottom-up procedure applies only to requisitions made to Air Force ICP's and covers requisitions with priority designators 1-8 which are 30 days or older, requisitions from CONUS bases with priority designators 9-15 which are 60 days or older, and requisitions from overseas bases with priority designators 9-15 which are 90 days or older. The process begins on the 10th of March, June, September, and December, at which time Air Force bases produce due-in validation request cards for the above requisitions. These cards are submitted via AUTODIN through DAAS before the 11th to arrive at the appropriate Air Force ICP not later than the 20th.

On the 21st, the ICP compares the cards received from participating bases with its records and submits appropriate status, follow-up, and cancellation cards to the base. Requisitions on the ICP's records for which a card is not received are automatically cancelled and these cancellations are included in the Air Force quarterly top-down MOV report. However, cancellations where the quantity on a requisition on the ICP records is less than that shown on the card from the base are not included in the report. Requisitions of bases not participating in the bottom-up process are not automatically cancelled.

Thus, the bottom-up process is, again, a records reconciliation process rather than a reconciliation/validation review.

Due-Out Process

The due-out process applies to all requisitions regardless of age and regardless of whether the material is managed by the Air Force, DLA, GSA, or another military service. It is a reconciliation/validation of all requisitions submitted to the Air Force base supply indexing by the units supported by that base, i.e., all due-outs from the base to its supported units.

Although procedures require a daily process of requisitions coded "urgent" and at least weekly processing of requisitions coded "immediate," the procedures require at least a monthly review of all requisitions (urgent, immediate, and replenishment), and is therefore referred to herein as a monthly process and only the monthly process is described here.

Each month, the base will prepare a due-out card and a listing of such due-outs for each unit it supports and copies of the listings are sent to the supported units.

Units will reconcile their records with the listing and contact the individual requiring the material to ascertain that the material is still needed. The listing is to be certified by a responsible official of the unit (1) that each requisition thereon

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has been reviewed with the ultimate user and (2) the annotated listing contains only valid requisitions. If a unit fails to respond, the base supply officer is to take action to insure timely response, but nonresponse does not require automatic cancellation.

On receipt of the listings, the base supply indexing verifies proper annotation and certification and enters the applicable data on the cards. The cards are then used to update the base due-out records; this update process automatically triggers action to update the corresponding due-in requisitions between the base and the ICP. Cancellations resulting from this due-out process are not included in the report on the top-down MOV process.

In-Line Process

This is a process required at least once each 2 weeks to ensure that ICP's are responding to requisitions in the proper time frames. The process is performed at the Air Force base, both overseas and CONUS, by a computer program. The program is designed to generate a follow-up to the ICP if the status or follow-up is not received from the ICP within specified times. Thus, it serves as a reconciliation of the base's due-in records with the related records of the ICP's. The process applies to all requisitions regardless of age and regardless of ICP, i.e., whether Air Force, DLA, GSA, or other military service ICP. However, it does not cover those requisitions, if any, that are recorded at the ICP which are not recorded at the Air Force base.

Eliminate Bottom-up Process

In early 1981, the Air Force was considering the elimination of the quarterly bottom-up process but delayed its decision pending a test to be performed by the Air Training Command (ATC). ATC will compare the compatibility of ICP and base records by using the bottom-up process at several bases, the top-down process at several bases, and consider whether the in-line process has overtaken the merits of the bottom-up process. The test is currently being planned and will be conducted over a 6-month period.

Navy Procedures

In the Navy, Type Commanders (Surface, Air, Submarine) of the Atlantic and Pacific Fleets have issued instructions requiring periodic validations of requisitions by the units within their commands. For example, the Commander, Naval Surface Forces, Atlantic, requires that a monthly validation be conducted of one-third of all outstanding requisitions (over 45 days old and with a value of $100 or more). The supply officer of the unit is to prepare a listing of such requisitions--which are given to the appropriate work center for validation. The work center supervisor reviews the listing and determines continuing requirements, validates the priority assigned, provides written justification for retaining the requisition, and cancels requisitions for items no longer needed. The listing is to be certified by the department head and returned to the

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supply officer within 10 workdays. The supply officer is supposed to take the action required by the annotated listing and maintain a file of the validation as well as a file showing the details of cancellations.

It should be noted that in the quarterly DOD-wide MOV process, requests for validation of requisitions by submarines are sent to the Type Commander, not to the submarine. The Type Commander reconciles his records with the MOV requests but does not go to the submarine for validation of the need.

Marine Corps Procedures

The Marine Corps has established a monthly validation process of all outstanding requisitions of Fleet Marine Force (FMF) units, regardless of age or ICP source of supply. During the last week of each month, the Supported Activities Supply System Management Unit (SMU) generates a card for each outstanding requisition and a listing of such requisitions. The user, down to the battalion level, is to reconcile the cards and listing with its records and validate the continuing need for the material. The cards and the original of the listing are to be annotated to indicate continuing need or to request cancellation, in whole or in part, and the Commanding Officer of the unit is to certify the listing. The unit keeps a copy of the listing and returns the cards and original of the listing to the SMU within 7 days.

The SMU checks the cards and listings received and processes the requested cancellations or necessary follow-ups to the ICP's. It should be noted that there is no provision for automatic cancellation for nonresponse and that the process does not apply to requisitions of non-FMF units. It should also be noted that this process is not a complete reconciliation of SMU and ICP records since requisitions recorded at the ICP that are not on the records of the SMU are not reconciled.

Proposed MOV "Top-Down" Changes

DOD is in the process of changing the DOD MOV procedure. As currently revised, the major proposed changes are as follows.

-- The cycles would be changed from quarterly to once every 4 months.

-- The response time would be extended from 45 days (approximately) to 75 days.

-- Increased assistance by DAAS for afloat and remote units would be provided to compensate for their lack of computer and communications capabilities.

This is further indication of the ineffectiveness of current procedures.

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Inadequacy of Procedures Demonstrated
by GAO and Military Audit Reports

Over the years, numerous GAO, DOD, and military service audit reports have demonstrated the inadequacy of the reconciliation validation procedures, particularly the lack of understanding of the concept of the reconciliation/validation process and the perfunctory performance by personnel involved. The reports demonstrated the resulting procurement or stockage of unneeded materials worth hundreds of millions of dollars through the failure to promptly cancel requisitions for unneeded materials.

Many of the findings of the earlier reports will be reiterated in two reports soon to be issued by GAO and the Army Audit Agency (AAA). A synopsis of these findings follows.

-- Requisitioning activities do not always furnish listings or cards of outstanding requisitions to the end-user.

-- When listings or cards were furnished to the end-user, they are not always returned and the requisitioning activity does not followup.

-- Review for continuing need of an item by the requisitioner is perfunctory.

-- End-users do not always report receipt of materials requisitioned.

-- End-users do not request cancellation of requisitions filled by other means such as lateral transfer from another organization, substitution, repair, etc.

-- Cancellations attributed to the reconciliation/validation processes are overstated because:

.. many (67 percent) of the cancellations reported resulted from normal day-to-day operations rather than the reconciliation/validation processes,

.. the Army, unlike other military services, included requisitions for major end items in its reconciliation/validation processes (these accounted for only a small percentage of the number of cancellations but a large percentage of the dollar value of cancellations) and these requisitions should not be included,

.. rejected requisitions are counted as cancellations although they were usually corrected and put in subsequently as new requisitions, and

.. cancellations are included in the reported statistics although the material had been received and were duplicates of previous normal day-to-day operations cancellations.

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-- Cancellations, particularly automatic cancellations for nonresponse, are frequently reinstituted in a subsequent period.

-- Requisitioners requested cancellation without regard to the dollar value of the requisition or supply status of the material although the ICP will not cancel a requisition if (1) there is a record of a transportation release at the depot and the dollar value is less than $25 or (2) the item is backordered for direct delivery procurement and the dollar value is less than $50.

Investigative Staff Observations

The Investigative Staff observed similar findings during its review. As described above, the impression is clearly drawn of a harrassed stock clerk, repetitively shuffling through his dog-eared files to satisfy the requirements of the various reconciliation and/or validation processes to the extent that normal day-to-day requisitioning and cancellation are not accomplished promptly, if at all. These processes are inconsistent, overlapping, and duplicative in that the ages of requisitions, types of requisitions, sources of supply, and cycles vary.

The Investigative Staff concludes that (1) time and effort is devoted to procedures which provide little more than a records-to-records check between the wholesale and retail supply levels, (2) reported savings resulting from the procedures are exaggerated and misleading, and (3) standardizing and strengthening of procedures under a single monthly "bottom-up" process offers the best chance for a viable user validation program. Thus, the Investigative Staff believes that the various inconsistent, overlapping, duplicative, and time-consuming efforts for top-down, bottom-up, and other periodic reconciliation/validation processes should be eliminated in favor of a single standardized validation process. The reconciliation function should be accomplished in a time frame which takes into account the capabilities and needs of all the parties involved. Most importantly, specific procedures and training should be provided to personnel involved in the process.

The Investigative Staff further believes that this solution should be applied to each of the military services as soon as practicable in order to provide a standardized DOD-wide procedure. This will result in (1) more timely and accurate cancellation of requisitions for items no longer required and (2) precluding the cancellation of valid requisitions--thus materially improving DOD's readiness posture.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation Hearings before the Subcommittee. The Secretary of Defense's response for the record is shown below.

RESPONSE

We concur with the comments on the Federal Catalog System (FCS). The description of the working of the FCS somewhat over-emphasizes the Defense Logistics Services Center (DLSC) role and underplays the responsibilities at OSD, DLA Headquarters, and the Services/Agencies. However, the statement of operation is a reasonably accurate summation.

The report is concerned with the Materiel Order Validation (MOV) Program, the purpose of which is to ensure that backordered requisitions are either valid or are canceled. It is critical of the current DOD "top down" procedure, intra-Service procedures, and the application of both to backordered requisitions. The DOD believes that the "top down" procedures are sound and that any unsatisfactory performance to be found is due to improper implementation of DOD policy and procedures at the Service/Agency level. It has been our past experience that the Services either resist a "bottom-up" procedure or do not maintain proper system discipline when operating in a "bottom-up" mode. To the extent that the report documents improper implementation of the "top-down" procedure, it at least forces the Services to react to the backorder validation requests transmitted by the ICP. The very reason for the MOV Program in a "top-down" mode was because the Services did not cancel unneeded requisitions on their own. We agree, however, that the MOV Program requires a review with the objective of strengthening the Program through standardization of procedures and increased surveillance. We will conduct such a review during FY 1982.

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Report of September 23, 1981

DOD SHOULD ADOPT A PROCEDURE TO CHALLENGE REQUISITIONS FOR NONSTANDARD AND NONSTOCKED ITEMS

The Committee has expressed interest in DOD's practices with respect to the acceptance of requisitions or nonstandard and nonstocked items submitted to Defense System Supply Centers (Inventory Control Points). In this regard, the Investigative Staff reviewed these procedures, interviewed numerous DOD officials at Inventory Control Points and at the working level, and determined that if nonstandard and nonstocked requisitions are "challenged" for validity from the Inventory Control Point back to the requisitioner, savings in unnecessary procurements could exceed $140 million annually.

The Defense Supply System's Inventory Control Points are asked to provide effective logistics support at the lowest possible cost. The Inventory Control Points manage a total of about 4 million items, 25 percent of which are referred to as nonstandard and nonstocked. Nonstandard items are managed solely to provide continued support for articles which at one time were actively used by the services. Some nonstandard items are being removed from inventory; others are being retained because the stocks on hand or in use are below the wholesale (Inventory Control Point) management level. Nonstocked items, on the other hand, are normally purchased locally by the user as a normal source of supply or they are purchased by a wholesale supply activity for direct shipment to the user. Other items included in this investigation are part numbered items, which are identified only by a manufacturer's part number. These items are not stocked and are not included in the supply catalog system. The Defense Supply System receives annually almost 7 million requisitions for these type items costing about $1 billion.

Invalid Requisitions Are Costing $5.6 Million Annually at One Defense Supply Center

The Defense Audit Service (DAS) found in June 1979 the Defense Logistics Agency's procedures did not provide for the special validation of requisitions for nonstandard and nonstocked items. A statistical sampling of these requisitions showed that, if questioned, about 23 percent of the requisitions would be cancelled because the requirements were invalid. At the Defense Electronics Supply Center DAS found that $5.6 million could be saved annually by suspending requisitions pending the validation of nonstandard and nonstocked requirements. The failure to cancel the invalid requisitions for nonstandard and nonstocked items results in a virtual loss of the money spent to buy them. These items are not authorized for stockage; thus, they cannot be returned and, as a result, they are probably disposed of in new condition when they are recieved.

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The DAS proposed that the Defense Logistics Agency require a special validation of requisitions for nonstandard and nonstocked items which are required to be procured and that such requisitions be suspended pending a response. DAS also proposed that requisitioners include future expected requirements of such items so that Inventory Control Points could convert such items to a stocked status where appropriate. The military services objected to the proposal and no further action has been taken.

Objections to the DAS Proposal Are Weak and Should Not be Allowed to Inhibit Implementation

The basic objections to the above proposal by DAS are it will (1) increase workload, (2) increase message traffic, (3) delay supply support, (4) possibly evolve into wholesale validations and cancellation of requisitions if users do not respond, and that (5) DAS savings are questionable.

Increased Workload

Undoubtedly, there would be some increase in workload if all nonstandard and nonstocked requisitions were challenged. Within the Defense Supply System there are 3 supply priorities; Issue Priority Group (IPG) I, (urgently needed); IPG II, (need immediately); and IPG III (routine replenishment). The proposal could be phased into effect using IPG III requisitions first to minimize the effect on workload and on readiness. Officials at the Defense Automatic Addressing System's Office (DAASO) (this office routes, transmits, and edits all of DOD's requisitions) stated the proposed challenge could be done automatically within their existing data system's capabilities with little impact on their overall workload. Some supply centers objected to this proposal since some items coded as nonstocked are, in fact, stocked items. (NOTE: This situation occurs when a customer requests a small number of nonstocked items. The ICP, in turn, frequently must procure the item at a "minimum" procurement quantity which exceeds the customers needs. These "excess" items are then placed into inventory as "nonstocked" inventory.) Thus, the supply center must manually process the challenged requisition.

Increased Message Traffic Will Result

There is some validity to this argument, but the increase in communications traffic is not as great as first supposed and the benefits of the increased traffic far exceed the costs of the increased traffic. The proposal requires the supply center to challenge these requisitions, but current procedures already require the supply center to advise the requisitioner that the material will have to be procured and to give the estimated delivery date. Current procedures also require the requisitioner to cancel the requisition if he determines that the material is no longer needed. Thus, the only increase in traffic involves the requisitioner's response as to whether the requirements are

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still needed. The Investigative Staff believes such increased communications costs would be insignificant in comparison with the benefits obtained by precluding procurements occasioned by the failure of requisitioners to notify the supply center that the material is no longer needed.

Delayed Supply Support Will Also Result

There is some validity to this argument. When an inventory control point or supply center receives a nonstandard or nonstocked requisition, the activity must prepare a "special" procurement in order to obtain the item. The DAS statistical sample found that an average of 50 days was spent to procure the item and another 150 days expired before the item was received by the customer. The validation procedure would add another 9 days to this process. This represents a 4.5 percent increase in the supply center's processing time. This disadvantage is more than offset by two highly desirable benefits.

First, the money "wasted" on the purchase of unneeded items could be saved and used to procure stocked items thereby increasing the supply systems' "stockage availability."

Second, the special validation could be used to support anticipated customer requirements. For example, the Defense Logistics Agency's stockage criteria requires three demands per year for an item to be reclassified from nonstandard or nonstocked to a stocked status. Also, the supply centers could avoid cost penalties imposed by a number of contractors from minimum value order restrictions. The supply centers could buy the additional quantities (based on data from their customers) at little or no added cost.

The System Could Possibly Evolve Into Wholesale Validations and Cancellations if Customers Do Not Respond

The Investigative Staff believes that objection may just as well serve as an argument for the implementation of the proposal. Specifically, it has been shown in previous sections that discipline in the Defense supply systems needs strengthening. If a customer is told to respond to a legitimate request by the supply center and he fails to do so, then his requisitions should be cancelled with a note of this failure sent to the Commanders of the organizations involved. Commanders can only correct those problems they can see.

DAS Savings Questionable

The Investigative Staff agrees that the potential savings projected in the DAS audit are questionable. The projected savings of $5.6 million included $3.4 million for cancellations requested and $2.2 million for cancellations requested which were actually achieved. The latter is duplicative of the former because some of the requisitions actually cancelled are also included in the computation for requested cancellations.

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The Investigative Staff believes a better measure of the potential savings would be the ratio of the number of cancellation requests received as a result of the DAS challenge (67) and the total number of requisitions used in the DAS statistical sample (346), or 19 percent. This is conservative because the numerator (67) excludes the 49 requisitions for which requests for cancellation had been submitted without challenge; the Investigative Staff believes many of these would have been requested to be cancelled earlier if a challenge process had been in effect.

House Appropriations Committee Interest

In the Committee's Report No. 96-1317, dated September 11, 1980, on the DOD appropriations for FY 1981, the Committee stated, "Based upon these findings, the Committee directs that the DLA place in effect a challenge system on these requisitions until such time as the customers (military services) have a valid requisition rate for nonstandard/nonstocked items which exceeds 90 percent for at least 18 months." DOD has not complied with the Committee's direction on this matter.

Investigative Staff Observations

The Investigative Staff believes that a nonstandard, nonstocked requisition challenge process can be effective. For example, the Army's Missile Command supply center has a procedure to challenge requisitions for nonstocked items coded Issue Priority Group III (routine replenishment). Nonresponse to the challenge within 30 days results in cancellation by the supply center. During the past two quarters, 230 such requisitions were challenged, of which 5 were validated by the requisitioner, 5 were requested to be cancelled, and 220 were cancelled for nonresponse.

The Investigative Staff found Defense Logistics Agency supply centers had filled about 540,000 requisitions for nonstandard and nonstocked items with a standard price of about $185 million during the first half of FY 1981, or an annual rate of about $370 million. These figures exclude requisitions--considered to be inappropriate to be subjected to a challenge process--for fuels, subsistence, and Military Assistance Programs.

Projection of the 19 percent, (requisitions validated for cancellation) discussed above, means that about $70 million of nonstandard and nonstocked items may be procured by DLA during FY 1981 even though the items are no longer needed by the requisitioner. The Investigative Staff believes this figure could be doubled to $140 million if requisitions for such items managed by the military services and GSA were included.

The Investigative Staff concurs with the findings of the DAS and strongly supports the objectives of the language contained in the Committee's September 1980 report on DOD appropriations. Furthermore, the Investigative Staff believes that automatic cancellation after a reasonable period of time (such as 30 days) after challenge would be far more effective than mere suspension of these requisitions.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

This section of the report recommends the establishment of a challenge process for requisitions for nonstandard and nonstocked materiel. We agree. Accordingly, further efforts will be made to develop a beneficial challenge procedure.

The Army has not implemented an automated challenge program for nonstocked, non-standard items based on the high probability of increased workload, increased message traffic, delay in supply support, wholesale erroneous cancellation of requisitions, and the probability that savings would not be as great as projected.

The Army does, however, have a manual challenge program at its missile command which, as a result of the low volume of requisitions for non-standard, nonstocked items, is successful in canceling a high percentage of requisitions.

The potential for a requistion challenge program is being reevaluated by Army with respect to application of automation or additional manual effort where requisition volume permits.

The Department of the Navy concurs that there are benefits to be achieved by minimizing the procurement of nonstandard/nonstocked items.

The Navy utilizes and maintains an extensive system of reference and cross reference materials which enables end users and supply processing centers to maximize the use of standard/stocked items. Extensive computer systems are in place to identify part number requirements to standard stock requirements. In addition, manual reviews are procedurally part of the preprocurement technical review process designed to minimize nonstandard material procurement.

In a further effort to reduce any invalid procurements in the Navy, the Defense Audit System (DAS) will be requested to provide data on Navy requisitions related to his problem for analysis and validation. The DAS data coupled with an in-house Navy review of procurement of nonstandard/nonstocked items will permit the analysis and identification of root causes of the problem. From this analysis, enhancements to the Navy's already extensive system for review of nonstandard/nonstocked items will be made.

The Navy considers the establishment of an all encompassing automatic challenge system to be premature at this time. Since the DAS indicated that the vast majority of nonstandard/nonstocked

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procurements were valid operational requirements, to delay to whole sytem does not appear at this time to be in the best interests of the Government from both an economical and readiness viewpoint.

The Air Force said the report of the Surveys and Investigations Staff which deals with challenging requisitions for nonstandard and nonstocked items is a comprehensive review of potential abuses. While the Staff observations seem more oriented to DLA-managed type items, there is obviously a need to review and revise challenge procedures for all nonstandard and nonstocked item requisitions.

New end item acquisitions and weapons system updates in the Air Force mean that nonstandard and nonstocked items will have to be requisitioned from time to time. (Naturally we have procedures to convert such items to standard and stocked.); however, we will direct the Air Force Logistics Command to develop challenge procedures to apply to those requisitions which are not applicable to weapon system modernizations and new end item acquisitions.

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Report of September 23, 1981

STOCK FUND MANAGEMENT

The National Security Act of 1947, as amended (10 USC 2208), gave the Secretary of Defense authority to establish working capital funds to finance inventories of such supplies as he may designate. The Secretary established stock funds in each of the military departments, in the Defense Logistics Agency (DLA), and in the National Security Agency (NSA). Each of these stock funds is divided into a number of item support divisions such as electronics, missiles, troop support, etc.

Prior to the authorization of stock funds, practically all support material was acquired directly with annual appropriated funds. Acquired inventory was issued "free" upon request from organizations and virtually no financial restrictions were placed on the quantities that could be requested.

Basically, stock funds consist of (1) cash on deposit with the Treasury and (2) inventories of supplies, materials, and equipment. Each stock fund finances the procurement of its inventories which, upon issue to the consuming organization, becomes an expense to that activity. Each stock fund bills (charges) the consuming organization for material "sold" to it and the stock fund uses the reimbursement received to finance replacement of its inventory. They are generally identified as revolving stock funds. How a revolving stock fund functions is depicted on the following page.

Objectives and Pricing

The legislation and DOD directives do not identify precisely specific management objectives or purposes for stock funds. However, GAO in one of its reports stated that legislative history, hearings, and DOD regulations seemed to indicate the more important goals are to:

-- Provide data for cost-of-performance budgets.

-- Minimize the requirement for annual apportionment by generating funds through reimbursements received from consuming organizations.

-- Manage items through a single manager under a simplified financial arrangement.

-- Obtain supply and financial control over both consuming organizations and fund managers through cost-consciousness incentives.

-- Reduce overall inventory by consolidating material needed by two or more services.

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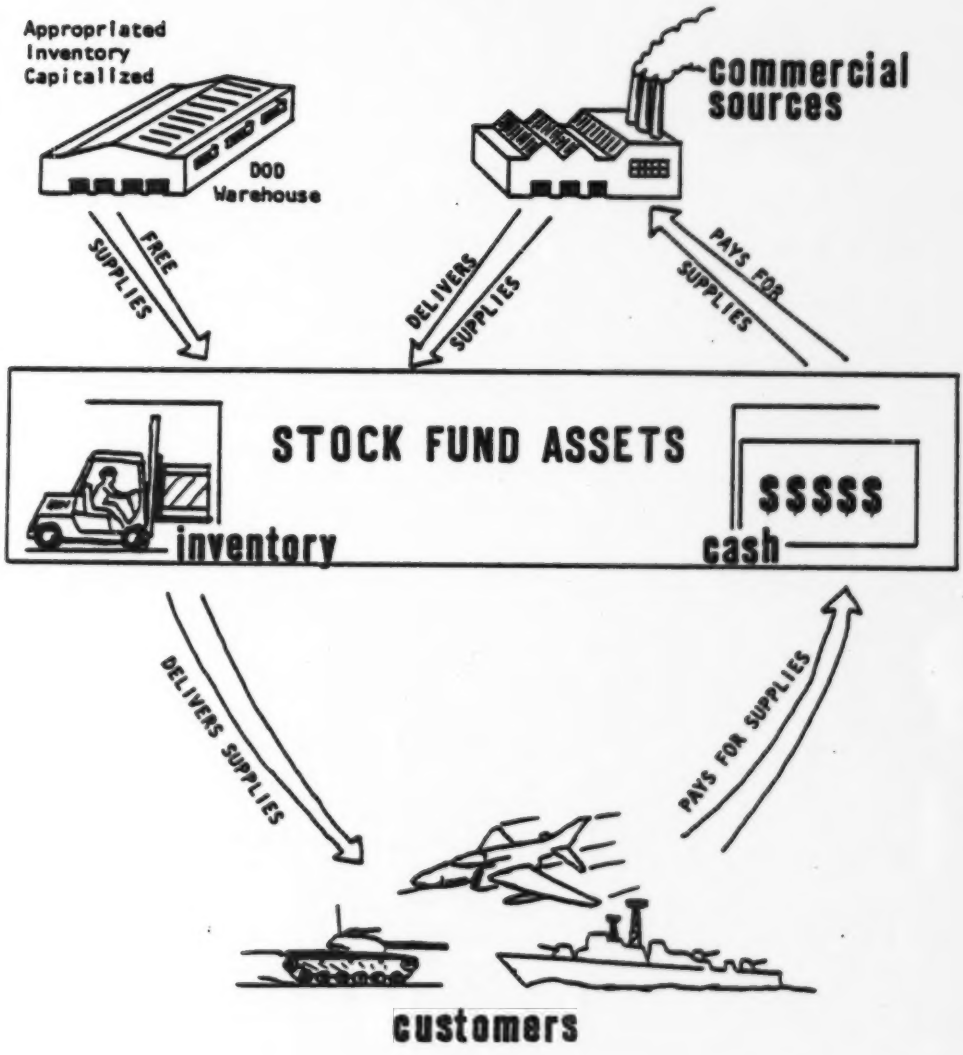
HOW A REVOLVING STOCK FUND WORKS



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Unlike industrial funds, which are organized to finance all the costs of producing goods and services ordered and subsequently paid for by its customers, stock funds as established by the DOD are not intended to be self-sustaining. The sales price (standard price) to the stock fund customer is not developed to recover all the costs incurred in operating the stock fund. The actual costs the fund attempts to recover are (1) material procurement costs, (2) transportation costs, and (3) estimated net inventory losses. In addition, since 1975 under the DOD rate stabilization program, the sales prices developed are to include an inflation factor which is directed by OSD.

Stock Fund Operation Expenses

The Investigative Staff questioned a number of ranking DOD officials concerning the exclusion of management/overhead costs from the price of stock fund items. None of these officials could provide any basis for the omission. The Director of Operations for the Secretary of Defense's Program and Budget Office equivocated on the possible inclusion of management costs into stock fund pricing. He noted that the inclusion might be a good thing since, "* * * frequently the lack of stock fund items is due, not to the absence of money to procure the material, but is due to insufficient personnel to manage the items (identify the requirements, procure them, receipt, store and issue, etc.). The inclusion of management costs in stock fund prices would highlight this problem."

The Army's senior logistician in Europe (a 3-star general officer) stated that he had been working with stock funds for more than 30 years and it was his belief that the exclusion of management costs from stock fund prices was done inadvertently. He felt management costs should be included in stock fund prices because it would better reflect the cost of doing DOD's supply business. Another high ranking DOD official involved in stock fund operations stated that stock funds are inefficient and self-serving but they do provide employment for a large number of accountants, nonetheless, stock funds are vital to Defense's Logistics System. He believes that the addition of management costs to stock fund prices would have little effect on stock fund operations. It would require more work and provide additional employment opportunities for still more accountants.

The expenses of managing and operating the stock funds--e.g., administration, supervision, inventory management, procurement, requisition processing, warehousing, repacking and handling, and any other function of supply administration--are financed from the operation and maintenance appropriation. Although these functions are relatable in varying degrees to stock fund operations, many of them include administration and operations for material which is not a part of the stock funds. For example, an item manager may be responsible for material requirements procured with major appropriation funds as well as those procured with stock fund monies. Also, Automatic Data Processing (ADP) systems include

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the operation of programs applicable to both types of material as well as, in some instances, to those related to maintenance activities. Similar relationships are present in the warehousing and shipping operations. Stock funded as well as major appropriation funded material may be handled by the same personnel and included in the same shipment to customers located at the same geographical location.

Composition of Stock Fund Inventories

Within the stock funds there are subdivisions of the material inventories which are maintained primarily because the DOD mission is to have sufficient inventory on hand to meet mobilization requirements whenever an emergency occurs. Such inventory represents additional stocks of vital material held in reserve to meet wartime needs. These stocks are generally funded from special appropriations or are acquired by transfer from other classes of material or by capitalization of inventories acquired with other-than-stock fund financing. Additionally, stock funds include inventories identified as long supply stocks which are retention stocks--those permitted over and above normal operating requirements, and potential excess stocks--those for which DOD no longer has a need and therefore are being screened for disposal. As of September 30, 1980, these categories of inventories were:

	Millions	Percent
Operating and other stocks	$ 7,791	44
Mobilization reserve stocks	5,029	29
Long supply stocks	4,830	27
Total	$17,650	100

The millions of items managed by the stock funds are classified primarily as stocked or nonstocked and whether they are to be purchased locally by the user. Stocked items are procured by the inventory manager and stocked at a number of supply activities. Generally, items are classified as stocked because past usage or initial projections indicate a future need. Items are classified as nonstocked either because there is no basis for estimating future need or past requests indicate very little or no future need. Items classified for local purchase are usually to be bought by the user from the local market. This is generally practical for units in Continental United States (CONUS). However, provision is made that users in remote or overseas areas can indicate to the inventory manager that local purchase is extremely difficult or impossible, in which case, the inventory manager will, upon request, buy the item and have it shipped to the requesting user organization.

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Financial Controls

Although the stock funds were theoretically designed to replenish their inventories with funds from sales which was to give them greater financial flexibility and minimize the requirements for programs to be funded through annual appropriations, this has not been fully realized. Each stock fund division must prepare a yearly budget for its inventory replenishment requirements. These budgets must be submitted to Office of the Secretary of Defense (OSD) and Office of Management and Budget (OMB) for their review and approval. The principal difference between stock funds and programs funded by annual appropriation is that Congressional and Presidential approval is not required for stock fund expenditures. OSD and OMB limit the expenditures which stock funds can make for material. This limitation is based primarily on forecasted sales and levels of inventory. According to GAO reports these constraints on expenditures through the apportionment process have resulted in the purchase of less than optimum quantities and an inability to provide material to consuming activities when needed.

Inclusion of Management Costs in Stock Fund Sales Price

Management cost is a very general term. There are administrative costs at all levels of DOD from OSD to and including those as far down the chain of command as the company or squadron. There are also many other costs, such as procurement, computer systems time, receipt, storage and issues, etc., involved in the operation of the stock funds. If DOD is directed to include management costs into the prices of their stock funded items there are at least two possible courses they will take. First, the DOD activities might attempt to obtain a precise definition of costs for the millions of items involved at each organizational level. These costs would then have to be applied to the prices of the stock funded items. This would be a labor-intensive effort and the results apparently would not be worth the effort. Secondly, a more likely alternative would be the use of overhead percentages. Specifically, each stock fund activity would estimate the amount of overhead or management expenses which are attributable to stock fund operations. These percentages would then be uniformly applied to each of the categories of stock fund items. This procedure is not without precedent since this is essentially the method used today to apply the transportation and wholesale and retail loss surcharges to the prices of stock funded material.

In either case there would be a requirement to increase the Operation and Maintenance (O&M) appropriation at the requisitioner level to meet the increased sales price. This amount would be offset by a decrease in the appropriations needed to finance the overhead/management costs of the organizations involved in DOD's stock fund operations.

DOD undertook this kind of effort in 1981. Management costs were included in determining the sales price of a very limited

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number of stock funded items managed by the Defense Personnel Support Center (DPSC). This situation is examined below.

Management Costs Included in the Price of Insignia

In each of the military services, clothing is managed through one of the stock fund subdivisions. Other than specialized clothing, military clothing, including insignia, is issued or sold to military personnel though the clothing sales stores, which in the Air Force and Army are managed by the military exchange systems. The military services are in the process of having the exchange systems assume management of all clothing sales stores' operations. A management fee is paid to the exchange systems for this service.

When the exchange systems fully assume this function, they will provide the full range of items that had been handled by the services' clothing sales stores. Also, the exchange systems are authorized to requisition centrally managed clothing items from DPSC at the catalog price. The exchange systems have agreed to sell these items to military personnel at the catalog price without the addition of their customary markup. This arrangement was intended to assure that the personnel would not be required to pay more to the exchange than had been paid to the sales store.

However, the DOD Appropriation Act, 1981 (P.L. 96-527 Section 764) stated none of the funds appropriated shall be available for the purchase of insignia for resale unless the sales price of such insignia is adjusted to the extent necessary to recover the cost of purchase of such insignia and the estimated amount of all related expenses, including but not limited to management, storage, handling, transportation, loss, disposal of obsolete material, and management fees paid to the military exchange systems, etc.

The result of this directive was to increase the price of insignia bought from the exchange system/clothing sales store by military personnel.

Adding Management Costs Increases Exchange System's Management Fee

In order to comply with the Appropriations Act, DLA's DPSC, and Defense Depot, Memphis, identified their costs of management, procurement, receipt, storage, and issue for insignia and derived a ratio of these costs to sales which equaled 7.6 percent. This factor plus 20 percent, which represents the approximate exchange system management fee, is included in the selling price billed to the exchange system and is the price at which the items are sold/issued to military personnel. To facilitate the administration and billing process this percent (27.6 percent) is added to all items in Federal Supply Class 8455 which includes insignia. Subsequently, DPSC periodically refunds the 27.6 percent of the insignia cost to the military service in which the exchange system store is located that originally bought the class 8455 items.

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This refund is a reimbursement from the stock fund to the O&M appropriation of the recipient military service.

The exchange system periodically totals its clothing sales/issues and bills the appropriate military service a management fee of 20 percent. This fee is paid from that service's O&M appropriation. Under this method the exchange system now receives 25.5 cents, as compared to the previous 20 cents, or an additional 5.5 cents for each $1.276 of the same quantity of sales. The result of this is as follows:

Increased management fee ----------	$0.055
Previous management fee ----------	0.200
Increased reimbursement to military department O&M funds ----------	0.021
Additional cost to military personnel -------	$0.276

Military personnel now buy the Federal Supply Class 8455 items at the 27.6 percent increase in price and finds his/her uniform allowance buys less. The uniform allowance is essentially indexed to increased costs. Thus, this price adjustment will presumably be offset by an increase in the uniform allowance.

Previously therefore, the military departments subsidized the exchange system's 20 percent management fee from their O&M funds and DPSC's management costs were not reimbursed. Under the new procedures, DPSC's management costs are still not reimbursed to DPSC; instead, such costs are included in the price but are credited to the exchange system (5.5 cents) and to the military department O&M appropriation (2.1 cents) as shown on the following page. It is noted that the military services no longer subsidize insignia purchases from their O&M funds.

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EXAMPLE OF INCREASED COSTS OF INSIGNIA
AND DISTRIBUTION OF INCREASE

	Cost Effect of P.L. 527, Sec. 764	
	Prior To	In Compliance
Commercial contractors' price to DPSC a/	$0.87	$0.870
DPSC's surcharge (14.67 percent) b/	0.13	0.130
DPSC's estimated related costs (7.6 percent)		0.076
Exchange system management fee of 20 percent c/	____	0.200
DPSC's sales price to exchange system and exchange sales price to military personnel	$1.00	$1.276
Exchange system's management fee--20 percent of sales/issues (paid from military department O&M funds)	$0.20	$0.255
Less: previous management fee (paid from military department O&M funds)	0.20	0.200
Decrease in military department O&M funds (results from increased management fee)	-0-	(0.055)
Increase in military department O&M funds (reimbursement received from DPSC)	-0-	0.076
Net increase in military department O&M fund	-0-	$0.021

a/ An assumed amount for example. There is no effect on such transactions.
b/ Surcharge to cover transportation cost, inventory losses, and economic stabilization.
c/ Used the Air Force management fee percent for purpose of example.

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Sales Price Comparisons

The exchange systems' retail stores sell the insignia item (class 8455), which they purchase from DPSC, at the price they pay DPSC. This includes the management costs factor and the management fee, a total of 27.6 percent. These stores also buy similar items from commercial sources which they sell at their marked-on price. A comparison of the two sales prices for a representative selection of like items disclosed the sales prices of the insignia purchased from commercial sources exceeded the DPSC sales prices by a range of from 27 percent to 782 percent. The average price of the commercial source items exceeded the DPSC sales prices by 173 percent.

Military Services and DLA Find No Purpose Served by Inclusion of Management Costs

Inquiries made by the Investigative Staff indicate that each of the military services and DLA find no purpose to be served by undertaking the task of devising a system or methodology that would identify and on some realistic and reasonably accurate basis allocate those elements of cost relatable to just the stock fund operations. Pertinent excerpts from their statements follow.

The Army's Position

Stock fund management is an integral part of the total supply accounting system in the Army. As such, it is not recognizable as a separate entity/cost, and it would be virtually impossible to factor all "management" costs related to stock fund into the cost of items.

Stock fund management is worldwide and encompasses such things as budgeting, accounting, procurement, receiving/shipping, storage, maintenance, etc. Costs could include people, ADP, temporary duty (TDY), facilities, and other. Since most people in stock fund management only spend part time on stock fund matters, it would be a monumental task to develop a factor to include in the price, and that factor would be of questionable value. Many people work with stock fund items (e.g., shipping/receiving and repair) and do not know (or need to know) that the items are stock funded, since the method of funding does not specifically impact the job.

It appears that the administrative burden would far outweigh the benefits, if in fact, there are benefits. The Office of the Deputy Chief of Staff, Logistics (ODCSLOG), does not believe the proposal is feasible from a cost standpoint.

The Navy's Position

While in an overall sense, it would be possible to include "management costs" in stock fund pricing and to finance the associated management costs with generated stock fund revenue, the Navy believes it is not a practical approach in that it would be quite difficult to execute and would not produce appreciable benefits in the sense of cost reductions or readiness improvements.

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To highlight some of the problem areas and assumptions involved, the following points of information and related assumptions are provided to illustrate the Navy's position.

The stock fund portion of the supply system is managed at various levels. At the top of the structure is the OSD staff which provides broad guidance on the subject of secondary items and reviews stock fund budgets. Inside the Navy, policies and budgets are developed and execution is reviewed at the Navy Comptroller (NAVCOMPT), Naval Operations (OPNAV), and Naval Material Command (NAVMAT) level with actual execution, control, and detailed policy and budgets being formulated by Naval Supply Systems Command (NAVSUP). In essence, a portion of these organizations exist to manage the stock fund as it relates to the Navy. Further, many agencies outside the Navy play a role in the procurement of items for the Navy stock fund and they would likewise require a feed of resources from the Navy and other stock funds.

The Navy draws a substantial portion of its stock fund support from DLA and other services. Further, much of the stock fund management costs incurred at Navy stock points actually relate to the management of DLA and other service stock fund items, either still under the ownership of DLA or having been purchased by the Navy stock fund from DLA or other service stock funds. Since the Navy sells these items to Navy customers at the standard DOD price, Navy would need a source of financing from other stock funds in order to cover what is presently an O&M financed supply system management cost.

In the secondary item world, Navy accumulates its management costs on the basis of function. Consequently, the Navy is not in a position to identify secondary items managed. Since the functions are essentially the same, the financing of management costs for stock fund items in a different manner than procurement account secondary items would require either a change to field activity cost accounting or an assumption of the distributions involved.

Navy activities, principally the inventory control points, incur management costs for secondary items which could be basically categorized as either program support or supply support. Program support generally includes the development or maintenance of requirement statements in support of weapon systems and ranges from provisioning determinations to the development and furnishing of individual tailored allowance listings to ships and aviation units. For purposes of this review, it is assumed that "management costs" refers only to the supply support area. While this might be relatively simple at an inventory control point, it would be more complex to identify at a stock point which is supplying both a Navy customer and providing services which are program support rather than supply support in nature. Further, since both areas would consume general support (administrative, personnel, data processing, etc.) which is not specifically costed back, it is assumed that either allocations would have to be made or these areas excluded from consideration.

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A portion of the O&M costs associated with supply support are generally fixed over the short term. An example might be facility maintenance and repair. Accordingly, it is assumed that the question envisions the selling price of stock fund items financing only variable operating costs.

The Air Force's Position

Identification of management costs reflects an arbitrary position due to the fact that stock fund and nonstock fund items are placed in the same warehouse, as well as in the same supply and accounting system computers. The volume of stock fund items is greater than that of nonstock fund items but the dollar value is less. Item control is more computerized for stock fund items than nonstock fund items. Nonstock fund items require more human management decisions related to item value, shipping expense, repair cycles, etc. The organizational structure of the headquarters and field level material management, comptroller, and procurement functions does not lend itself to separate cost accounting in support of the stock fund. In view of the broad nature of the logistics management, it is not considered economical or practical to attempt to identify the time expended (management costs) on stock fund versus nonstock fund activities.

It would be difficult to allocate management costs to the logistics process without developing/programming a new accounting system. Even a percentage factor based on a study would be suspect because there is no distinct starting point, i.e., no warehouse floor space distinctions or separation of labor costs.

Management expenses are funded by the Air Force Logistics Command's (AFLC) O&M appropriation. One of the apparent reasons to add these costs to the stock fund price is to reimburse O&M. Through March 1981, the sale of Systems Support Division stock fund material was $125.8 million to O&M and $269.3 million to the Air Force Industrial fund. The Industrial Fund statistics for sales to O&M through March 1981 show approximately 90 percent of the material charged back to O&M for aircraft maintenance. With stock fund sales to other Air Force appropriations amounting to only $32.8 million, it is obvious that over 90 percent of the added charge to reimburse O&M would be paid by O&M in the sale price. The remaining 10 percent represents sales to other than O&M customers. It would require an extensive accounting procedure to identify the customers involved in the 10 percent figure--and it is only this 10 percent which would prove beneficial to O&M accounting.

Defense Logistics Agency's Position

For several years, the House Appropriations Committee has expressed an interest in having the DLA supply system revised so that the cost to buy, store, and manage an item is included in the price of that item to the military service customer. The intent is to give the customer the ability to make an economic decision and procure the item from the supply system or the commercial

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market, whichever is lower, thereby reducing the overall cost to the Government.

The illustration below contains an estimate of the cost impact to the customer in terms of FY 1980 dollars and a summary list of functions which would be included or excluded from the calculation. This is an initial estimate and would require much refinement should DLA be compelled to implement the system.

Defense Logistics Agency Costs

In lieu of O&M funding in FY 1980, DLA would have charged approximately $560 million to its customers by adding a 14.9 percent surcharge to sales of $3.771 billion.

These figures include:

-- Costs and sales of DLA supply centers (less Defense Fuel Supply Center).

-- Costs of DLA depots.

-- Costs of the DLA Customer Supply Assistance Office.

-- $2.5 million estimated for increased accounting requirements.

-- A portion of costs for:

  .. Headquarters operations (including the Central Fund, Support Center and Inspector General-IG).

  .. DLA Systems Automation Center.

  .. Defense Logistics Services Center.

  .. DLA Central Intern Development Office.

  .. Communication provided by the Defense Automatic Addressing System.

  .. The DLA Regional Telecom Offices.

These figures exclude:

-- The fuels commodity with a low cost to sales ratio.

-- Additional military service costs.

-- Investment costs.

-- Contract administration costs.

-- Property disposal costs.

-- Industrial plant equipment operation costs.

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While there are imperfections in the current system, including a few "horror stories" of grossly overpriced items, DLA believes the use of an industrial fund to solve these relatively minor problems would result in major problems. The success of the system would hinge on the ability of the commercial sector to support defense needs. DLA's experience in using the commercial supply system so far indicates defense expenses would increase while military readiness would deteriorate. Today, 37 percent of DLA's back orders are for nonstocked items.

During implementation of the Civil Engineer Support Program (CESP), the military services identified 1,237 items which could be decentralized for customer local purchase. Since then, DLA has experienced sufficient central procurement demand to redesignate 537 or 43 percent of the local purchase items back to central procurement and stockage. This did not happen in a period when the services were "overfunded." In FY 1980, the services also identified 1,856 items which could be coded from stocked to nonstocked. Demands since then required the recoding of 977 or 53 percent of these back to stocked. The process increased both DLA and service procurement and management workloads. Readiness deteriorated because items were not available in or could not be ordered from the commercial sector.

In addition to increasing unavailability, more local procurement will also affect readiness by bringing nonstandard items into military inventories. Centrally procured parts and components are carefully reviewed and tested by standardization teams to ensure reliability in any combination of worldwide or near-space environments. Many of these items are visually similar to commercially available parts that are not required to withstand the vibration, temperature, altitude, or other conditions to which military equipment is subjected.

Investigative Staff Observation

It is clearly feasible to cause stock fund managers to include management costs in the price of items "sold" to a military customer. At this point, however, the Investigative Staff is not finally persuaded on the advisability of taking such action.

If the stock funds are intended to provide a "buyer-seller" relationship between the stock fund manager and his customer (almost no one interviewed in DOD agreed that this is the case), then clearly management costs should be included in stock fund prices since they are a cost of doing business.

On the other hand, if stock funds are basically a convenient means of financing the cost of purchasing the consumable items, DOD needs to accomplish its day-to-day business (almost everyone interviewed in DOD agreed that this is the case), then the inclusion of these costs will only complicate the process.

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Emphasis Is Needed for Stock Fund Management Improvements

Stock funds are revolving funds established as a means of purchasing and holding material for eventual sale to users. Proceeds from the sales to customers are used to purchase additional inventory for future sale. There are five stock funds in DOD which operate under the policy guidance of the Secretary of Defense. Each of the military services operates a stock fund comprised of a number of subdivisions designed to provide for its own needs. DLA operates a stock fund, also with a number of subdivisions, which buys items assigned to it for management and sells them to the military services.

Each stock fund is responsible for its own supply and financial management. No precise guidelines for organizational structure or procedures have been made mandatory, therefore each military service and DLA has developed its own concepts and methods of operating its stock fund. Basically, two types of stock fund management have been developed--the vertical and the horizontal.

Vertical and Horizontal Stock Funds

In vertical stock funds, the wholesaler procures inventory from commercial sources with the fund's working capital. The inventories are maintained either at the fund's wholesale storage facility or at the fund's various retail outlets. Reimbursement takes place when the stock fund issues items to the ultimate users, not when it transfers items to the retail storage levels. Thus, regardless of where the inventory is maintained, it is owned and controlled by a designated inventory control point.

In a horizontal stock fund, the wholesale stock fund is reimbursed when it transfers items to the retail storage levels. Thus, the wholesale and the retail levels must be funded separately and supported by separate stock fund accounting structures and procedures. Charts displaying the operation of horizontal and vertical stock funds follow.

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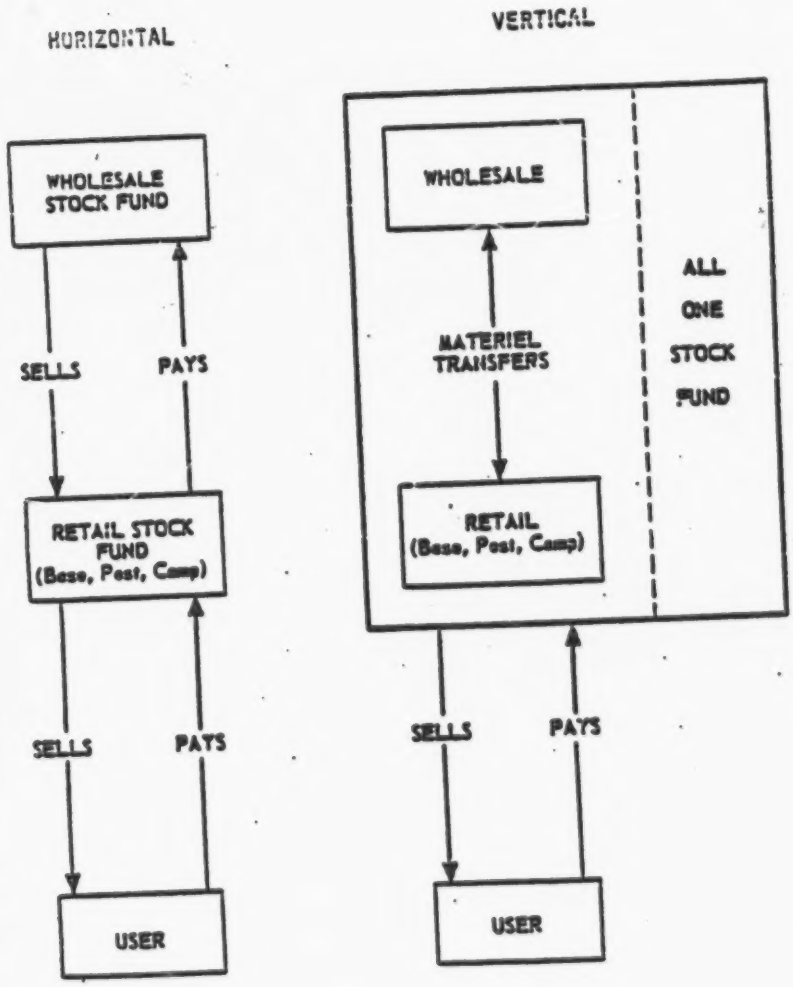
HORIZONTAL AND VERTICAL STOCK FUNDS



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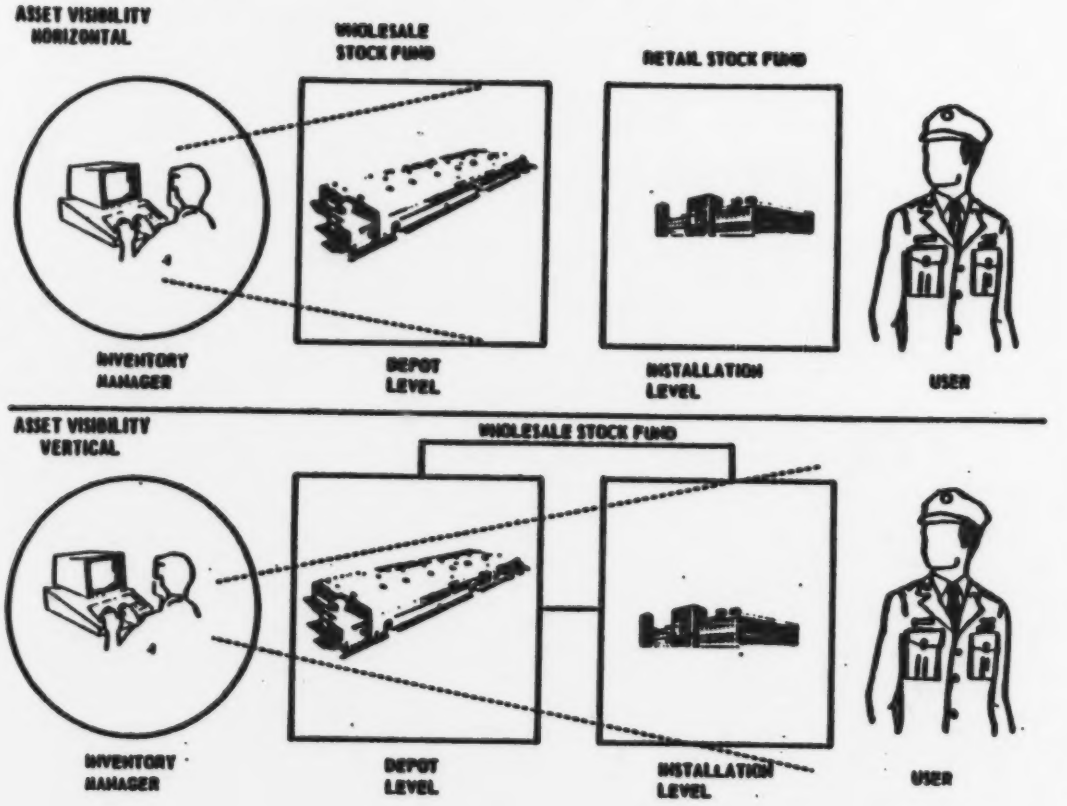

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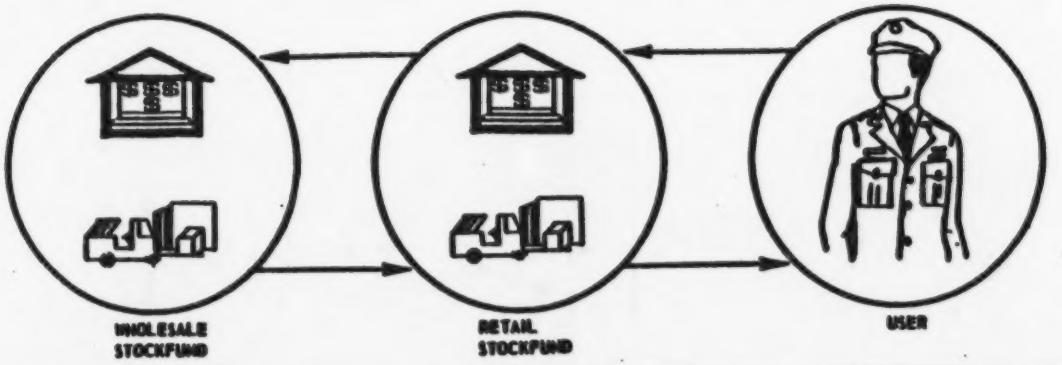
HORIZONTAL TRANSACTION



VERTICAL TRANSACTION

In April 1974, GAO reported significant reductions in inventory can be directly attributable to stock fund management. The report also urged that the adoption of a vertical system of management by all the military services offers several advantages:

-- Duplicate inventory functions can be eliminated which would result in significant savings.

-- The specialized support depots operated by the DLA could be eliminated.

As far back as May 1972, the Assistant Secretary of Defense Manpower, Reserve Affairs, and Logistics (MRA&L) and the Assistant Secretary of Defense (Comptroller) issued a joint concept paper which cited the following advantages for vertical management of stock funds.

-- Item manager's worldwide knowledge and control of assets would increase management efficiency.

-- Increased systemwide visibility would result in more effective use of DOD inventories.

-- More effective use of inventories would permit reduction in total inventories of improved systemwide stock balances and increased supply response with the same inventories.

-- Reduction in total inventories and/or improved DOD-wide stock balances would result in reduced operations and maintenance costs per unit of support (less labor costs in handling, inventorying, etc., and reduced requirement for warehouse space).

-- Increased worldwide visibility for selected items and high response ADP systems would increase combat readiness, i.e., permit rapid screening of high priority requisitions against total DOD assets.

-- Reducing the number of stock fund sales transactions would significantly reduce accounting transactions without reducing combat effectiveness.

-- Flexibility for any required positioning of material without financial constraints would be increased.

Although this concept paper called for implementing vertical management operations in 1975-80, it has as yet not been accomplished. In fact, 3 years after the joint concept paper in January 1975, a joint memorandum was issued which stated DOD's planning for and application of vertical supply management would be developed on an evolutionary basis which would satisfy the following fundamental prerequisites.

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-- A standard stockage policy (range and depth) must be developed for the intermediate and consumer levels of supply. The proposed policy is being developed by the Retail Inventory Management Stockage Policy (RIMSTOP) Working Group.

-- Formats and rules for reporting assets "owned" by a DOD item manager and held at the designated intermediate level of supply will be standardized.

-- Criteria will be established for those conditions under which a DOD item manager can direct redistribution of intermediate level stock to meet a higher priority demand within the same or another component.

-- Each DOD component will have centrally designed, standard automated systems with standard interfaces for both the wholesale and intermediate (including stock fund management) levels of operation.

-- DOD will adopt standard intransit item visibility.

DOD Progress in Achieving Vertical Stock Fund Management Lags

In order to solve these problems and make further progress toward full implementation of vertical stock funding, a DOD working group has developed RIMSTOP which is designed to provide standard retail stockage policies that will permit the determination and evaluation of valid stockage requirements for retail customers. DOD has indicated that if the improvements contained in RIMSTOP are achieved, this would aid in extending vertical management controls from the wholesale to the intermediate level and in the long term provide much more effective total system capability to meet customer needs.

Currently each DOD component designs its logistics ADP systems for intraservice applications. However, DOD feels that progress toward compatible automated data processing systems for wholesale and intermediate supply operations on an interservice basis is being achieved through programs like RIMSTOP and the Military Standard Systems.

As indicated above, the progress toward accomplishing complete and integrated vertical stock management and funding has been extremely slow. Over 10 years ago, the DOD logistic plan recommended that vertical stock funds be adopted throughout the distribution system. That recommendation has yet to be implemented. Furthermore, although DOD recommended its adoption over 10 years ago, at this time DOD has not established a time table or milestones for its complete accomplishment.

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Extent of Air Force and Navy Vertical Management

With two exceptions, most of the stock fund operating divisions are managed by a horizontal system. The Air Force Systems Support Division has been vertically integrated since its inception in 1968. Under this method, the inventory manager has control over all the items managed. This enables the inventory manager to compute worldwide requirements; to procure supplies; to position, redistribute, and dispose of stock; and to control excesses. The Air Force system incorporates a standard base supply system which facilitates movement of personnel between locations and minimizes orientation and training, permits centralized standard programming, and allows a review of worldwide operations.

The Navy vertically manages all of the wholesale stocks controlled by its two ICP's (Aviation Supply Office and Ships Parts Control Center). The Navy manages and has knowledge of 95 percent of stock availability at its stocking activities by means of a combination of daily transaction item reporting (TIR) (70 percent) and cyclic asset reporting (30 percent). TIR provides daily reporting of receipts, issues, and other transactions that affect stock balances. Navy ICP's have visibility of and access to its inventories at all stock points to satisfy worldwide requirements. Currently, the Navy is testing the application of the stock funding approach to depot ships reparable items.

Army Continues Horizontal Management

The Army continues to use the horizontal system for management of its stock funds. This results in limited visibility of worldwide stocks; therefore, inventory managers cannot effectively redistribute excess stocks or order redistribution of items to meet high priority needs. This results in longer leadtimes for processing requisitions which requires large inventories, especially in Europe. Since the ICP does not have control over assets at intermediate levels, it cannot effectively redistribute stocks at the direct support unit level to meet high priority needs. Therefore, safety levels are established at all these locations to meet such needs or to provide for greater than average order-ship-times. Much of this need for safety levels could be avoided.

The Army has persisted in continuing its horizontal stock fund management despite the OSD policy promulgated 10 years ago. According to GAO's report in 1977, the Army's primary reasons for opposing vertical control were:

-- Loss of control over all intermediate level supplies.

-- Would compromise field commander's control over stocks needed to perform their missions.

-- DOD has not provided evidence that vertical controls are cost beneficial.

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-- Lacking assurance that logistics responsiveness will not be compromised.

According to the conditions disclosed by GAO in its report, there is little evidence to support the Army's position. In comparing Army to Air Force order-ship-time in Europe, GAO estimated the Army added about $9 million to United States Army, Europe (USAREUR) inventory requirements to accommodate pipeline differences. Likewise, the percentage of excess inventory in the Army horizontal system exceeded that in the Air Force vertical system by approximately 12 percent. In dollars, the Air Force had an average excess inventory of $1.5 million whereas the Army had an average of $25.9 million. The Air Force was able to laterally distribute stocks between bases in 1 to 2 days, whereas within the 8th Infantry Division, an estimated 80 percent of attempts at lateral supply were unsuccessful each month. It appears that although the Army's Corps have weekly reporting of items each unit is authorized to stock, it is of little value. The field commander has control over his stocks but he has no effective means for readily transferring the stock to where it is needed.

The Army has revised its supply systems in an effort to improve the inventory managers' visibility over selected items. The latest version of the Standard Army Intermediate Level Supply System (SAILSS) and the Army's Selected Item Management System (SIMS) implemented in late 1980 are designed to give the ICP inventory managers visibility of over 1,500 reparable items. This is a continuation of the Army's approach to obtaining visibility over a small quantity of high dollar inventory items. The extent to which this latest revision of the Army's supply systems has been successful is not available at this time. An evaluation of these systems will require examination at both the wholesale and the intermediate level.

During a recent trip to Europe, the Investigative Staff noted that the VII Corps Material Management Center had limited visibility over the stocks possessed by its combat divisions. Similarly, the Theater Army Material Management Center had limited visibility over theater Army stocks and little cognizance of stocks possessed by the V and VII Corps. Personnel at the theater's Intermediate Aviation Maintenance Battalion stated when an aircraft spare part was critically needed, he telephoned his counterpart organizations at V and VII Corps to determine availability of the part.

According to a former Army Deputy Chief of Staff for Logistics, the Army logistics system is not organized properly to accomplish its missions. There is no one in charge of the whole system! As a result, the system cannot be effectively or efficiently managed in peacetime or wartime. If the United States were suddenly thrown into a major war, the Army logistics system would have to be reorganized as was done for both World Wars I and II. The major difference is that this time, time would not be available to reorganize.

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DLA Manages Most of its Stock Fund Horizontally

DLA operates the largest stock fund. Most of its stock fund managers own and have visibility, like the Army, only to the depot/wholesale level. Once the items are shipped from the warehouse, the managers no longer own or have visibility over those items.

Use of the vertical system of stock fund management can eliminate millions of accounting transactions required in the horizontal systems. GAO estimated that Defense Electronics Supply Center could have eliminated over 5.3 million transactions annually by the use of a vertical stock fund system.

Currently DLA is implementing or has implemented vertical controls over bulk petroleum and subsistence items. However, there are major problems involved in extending vertical management to other classes of supply. One, is to establish a stockage policy common to all the military services and another is to establish a computer system with compatibility and the capacity to manage DLA items carried by the military services.

Investigative Staff Observation

To determine the extent to which DOD policy statements and GAO recommendations have been implemented effectively requires an indepth examination and evaluation of the action taken and the results achieved. Additionally, extensive analysis and estimation of the costs and system changes required to convert to vertical management of stock funds in the Army and DLA needs to be undertaken in order to identify the potential savings and improved supply effectiveness that could be attained through such changes.

USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

The report discusses two major points regarding stock fund management:

-- inclusion of management costs in stock fund prices and;

-- expansion of vertical stock funds.

Although there has never been a single precise DOD position on these longstanding issues, the generally enunciated positions are as follows:

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1. The inclusion of total management costs in stock fund prices to the customer might provide a more precise statement of the cost of materiel support for operating forces for those items included in the stock fund. DOD has not moved in this direction, however, because of the high cost of developing and maintaining the extensive accounting system which would be required to obtain and update management costs; the fact that major portions of logistics management costs are not relateable to stock fund items; and the potential that by incorporating management costs in an overall stock fund pricing mechanism, the functional and fiscal visibility obtained by having these costs in appropriated accounts (O&M, Military Personnel) would be extremely reduced. Further, management improvements to be obtained by including total costs in the stock fund pricing have never been effectively or convincingly determined. The S&I observations state "the staff is not finally persuaded on the advisability of taking such action." DOD agrees.

2. One of the primary factors affecting DOD efforts to implement greater vertical management conrols is the need to weigh the advantages of these controls with the increased costs of these programs, including manpower resources. Our aproach to insuring a continued cost effective use of vertical management is the selective application of this technique to those items of supply which will yield the greatest benefits, both in terms of expenditure of resources and military readiness. Reparable components and critical or high cost consumable items offer the greatest potential for the cost effective use of improved vertical management in the near future. DOD is currently implementing the Retail Inventory Management and Stockage Policy (RIMSTOP) program which will significantly improve vertical mangement capabilities for selected items. The Air Force and Navy have implemented vertical stock fund management to varying degrees. The Defense Logistics Agency is proceeding in selected commodities (POL and subsistence). Further expansion of vertical stock funds, particularly in the Army, would require major organizational and data systems changes. These changes should not be undertaken without substantially more evidence of significant cost and readiness benefits. At the present, a more prudent course appears to be greater emphasis on eliminating redundant inventories, improving materiel returns, standardizing management systems and expanding vertical management of selected high dollar and critical items. The S&I observations state, "extensive analysis and estimation of the costs and systems changes required to convert to vertical stock funds...needs to be undertaken." DOD agrees, if such a review can be accomplished in conjunction with current ongoing efforts to improve overall supply management.

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Report of September 23, 1981

DOD SHOULD DIRECT THE SERVICES TO TRANSFER MANAGEMENT OF CONSUMABLES TO THE DEFENSE LOGISTICS AGENCY

Each of the services and the Defense Logistics Agency (DLA) operate separate facilities required to receive, store, and issue the material for which it has wholesale management responsibilities. There exists a multiplicity of managers performing essentially duplicative functions for the same types of consumable material. Each manager has developed his own management philosophy, policies, procedures, and data systems, resulting in significant waste, particularly in the areas of unnecessary manpower and supporting facilities costs. Additionally, the consolidation of procurement requirements for classes of consumable items rarely occurs. Thus, the possibility for substantial savings, which could be achieved by applying DLA's much higher level of price competition, is lost. Specifically, during FY 1979 the military services awarded 25 percent of their procurement dollars competitively compared with 68 percent achieved by DLA centers. An analysis by the Defense Logistics Analysis Office (DLAO) reveals that, "For each 1 percent that DLA improves competition beyond the level achieved by the Services an annual savings of $12.7 million will result."

In December 1978, the Office of the Secretary of Defense proposed the transfer of consumables from the military services to DLA in order to achieve total potential savings of $200 to $300 million. The proposal provided data which demonstrated that DLA's management of consumables will improve DOD's overall logistics readiness and reduce costs.

The Army, Air Force, and to a lesser extent the Navy, are opposed to the consolidation of consumables under DLA for reasons that can be classified as parochial and sometimes emotional.

This section is intended to clarify the primary issues related to the OSD proposal.

At the end of World War II the Department of Defense operated 25 separate supply systems. Extensive fragmentation and duplication existed. As a result of the Hoover Commission Report, some progress began during the period of 1953-56 with single manager assignments to the military services for commodities such as fuel, medical, subsistence, clothing, and textiles. Under these assignments, a single activity was designated as "class manager" with DOD-wide responsibility for all items in a group of Federal Supply Classes (FSC's). The next step toward integrated management was the establishment of the Defense Supply Agency (DSA) in 1962 and the transfer of the single manager commodities to DSA. (Note: In January 1977, DSA was redesignated the Defense Logistics Agency (DLA).

As additional FSC's were assigned to DLA, the Office of the Secretary of Defense decided that certain items should remain with

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the military services. These items included end items of equipment, depot level repairables, and selected consumable items. The term "consumable items" encompasses (1) expendable items; items including minor spare parts which are either consumed in use or discarded when no longer serviceable, and (2) field level repairables; items repaired or condemned in the field, rather than items returned for repair at depot level.

The Item Management Coding (IMC) is the mechanism used to identify items or classes of items that are to be managed by the services or DLA. There are currently ten criteria which, if met, allow the military services to retain an item. The IMC criteria have been revised a number of times. The last major revision resulted from a Deputy Secretary of Defense memorandum of June 16, 1971, which established the principle of one item, one manager. Subsequently, 45 additional classes were assigned to DLA.

DOD uses approximately 4 million national stock numbered items which are categorized into 412 Federal Supply Classes. DLA currently manages about 2 million items. There are approximately 1.3 million consumable items managed by the services which OSD is prepared to transfer to DLA.

The Savings to Be Achieved Are Impressive

The Investigative Staff believes that the transfer of the remaining 1.3 million consumable items from the services to DLA could realistically result in annual savings of $200-$300 million. These savings will be achieved through the reduction of personnel and facilities as well as more streamlined, efficient, and economic procurement practices.

Manpower and Facilities Reduction

The services' and DLA's wholesale supply systems are run by Government civil servants. There is only a light veneer of military management present in any of these organizations. Thus, the question of manpower reductions centers on the ability of these civilian employees to manage the items assigned to them. In May 1980, the Defense Audit Service (DAS) compared the functions performed and costs allocated by the services in the management of consumable items to those functions and costs being incurred by DLA to manage the same type items. The review disclosed that the services were using 6,126 personnel at an annual cost of $116.7 million to manage their consumable items, compared to an estimated 2,391 personnel at an annual cost of $43.8 million by having DLA manage the same number of items.

The DAS comparative analysis appears valid and the estimated savings of $72.9 million seems achievable. Yet, the persistent question remains, "Why are DLA's civil servants more productive than the civil servants in the employ of the services?" The Investigative Staff believes the answer to the question is quite basic--DLA is in a better position organizationally than are any of the three

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services logistics commands. Specifically, DLA is a defense agency with a single basic mission--to provide supplies to the services when and where they are needed. If the DLA commander needs personnel, equipment, or facilities to accomplish this mission, he need only convince the Office of the Secretary of Defense, to whom he reports directly, and he will normally receive the required support. Senior service officers have expressed concern that DLA can receive this type of financial support, however, this is one of the characteristic advantages of all defense agencies.

The service logistics commands (DARCOM, AFLC, and NAVMAT), on the other hand, have a much tougher battle to acquire the resources they need to accomplish their missions. Even though these commands are headed by senior General or Flag rank officers, each of them must vie with other major four-star commanders, within their service for available dollars. Historically, there is ample precedent to show logistics commanders usually fare rather poorly in this budget contest. For example, the Director of the Budget at the Air Force's Logistics Command was asked about the types of projects that were funded or not funded at the end of the fiscal year. He stated that, routinely, facilities projects are deferred due to the lack of funds.

Unquantified Personnel Reduction Would Add to the Savings

The military services and DLA each have staffs at their logistics command headquarters and at the Inventory Control Points for developing and implementing policies and procedures, designing and programming data systems, and managing wholesale stock funds for consumable items. If the consumable items were transferred to DLA, the military services would no longer be responsible for the management of consumables or operation of their stock funds. Therefore related staff positions (about 4,000) and the supporting facilities could be reduced or eliminated.

Streamlining of Procurement Procedures

The largest potential area for savings clearly lies in achieving more efficient and economic procurement procedures. A review of FY 1979 procurement data reveals that the military services awarded only 25 percent of their procurement dollars competitively for consumable items compared with 68 percent achieved by the DLA centers for the same type of items.

DLAO presented the following data to support the competitive procurement difference between the military services and DLA centers for items subject to transfer.

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	FY 1979 Total	Competitive	Non-competitive	Percent Competitive
		$ In Millions		
DLA -------	$1,398.6	$ 948.4	$ 450.2	67.8
Services --	$7,570.9	$1,918.9	$5,652.0	25.3

DLA has an aggressive program for "breaking" sole-source procurements. The objective of the program is to review currently noncompetitive purchased items, to find or develop additional technical data, and to interest new sources to bid on their solicitations in order to expand competitive procurement.

The DLAO analyzed the results of this program at three DLA centers with the following results.

DLA Procurement Evaluation $ Savings - FY 1978

DLA Center	Cost Before DLA Evaluation (000)	Cost After DLA Evaluation (000)	Savings (000)	Percent Savings
DISC (172 cases)--	$3,834	$1,563	$2,271	59.2
DESC (48 cases) --	2,636	1,502	1,134	43.0
DCSC (283 cases) -	6,804	4,204	2,600	38.2
Total (503 cases) -	$13,274	$7,269	$6,005	45.2

During FY 1980 the military services made $3.748 billion in wholesale stock fund purchases. Assuming the DLAO competitive percentage for the services is still valid (25 percent), then approximately $2.811 billion of these purchases were made noncompetitively. If these consumable items are transferred to DLA and DLA applies its procurement evaluation effort to these items, the potential for savings is $1.270 billion ($2.811 billion x .452), or for each 1 percent that competition increases beyond the level currently being achieved by the services, an annual savings of $12.7 million will result ($1.27 billion divided by 100).

The military services could possibly achieve some of these savings under the current distribution of consumable items. However, there are several factors which mitigate against pursuing this course. First, the Investigative Staff, in numerous discussions with military service procurement officers, perceived that these officers are primarily interested in receiving a quality product,

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when they need it, from a contractor who causes few, if any, problems. Cost-effectiveness and the pursuit of competition are less important considerations in their procurement philosophy, analysis, and procedures. Second, each of the services and DLA are procuring the same type items from various contractors around the country. There is no single source of information to determine the total DOD requirements for a particular type of item. The Investigative Staff is working with the Defense Contract Administration Service (DCAS) to develop the magnitude of this situation.

The Military Services' Objections

While the reasons for effecting the consolidation of consumables at DLA appear to be overwhelming, the Army, the Air Force, and to a lesser extent the Navy, are opposed to this proposal. Their concerns lie in three major areas: readiness (supply support), item complexity, and the validity of the economic analysis.

Logistic Readiness

Operational readiness is dependent on training, maintenance, retail level of supply, as well as wholesale supply support. Only the wholesale supply support is the responsibility of the integrated manager and would be affected by the proposal to consolidate DOD's consumable items.

The services have expressed serious concern about the impact that transferring management of consumable items would have on supply support to customers and the consequent effect on force readiness.

There are two major components to "Logistics Readiness." The first is Supply Availability (percentage of requisitions filled from on-hand stocks) and the second is Total Pipeline On Time Performance (the promptness of delivery of material requisitioned). Of the two factors, Supply Availability is generally recognized as the most significant measure of supply support. This is because Supply Availability means the requisition is filled from available stocks, thus avoiding having to back order an item or have it directly delivered from a contractor. Either of these latter two actions routinely adds weeks or months of delay in satisfying the requisitions. On the other hand, the Total Pipeline On Time Performance represents, approximately, the percentage of items shipped which the requisitioner received on time. The term "on time" in this case refers to an arbitrary standard established by the Uniform Material Movement and Issue Priority System (UMMIPS). Shipments which are not on time by this criterion are often late by only a day or a few days. While the impact of even this lateness can be very important, it would not be as serious as not having the item in the system at all.

In order to quantify the ability of the Services and DLA to provide consumable supplies to their customers, the Investigative Staff obtained the following data.

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Supply Availability Percentage - Consumables Only

	Army	Navy	Air Force	DLA
FY 1977 ----	81.8	79.7	82.9	92.3
FY 1978 ----	77.7	78.7	82.6	91.5
FY 1979 ----	79.5	76.3	83.9	91.6

It is significant to note that the DLA rate exceeds the military services by 7-15 percent throughout the period.

The services have alleged that DLA's methodology in computing supply availability rates was different than the methodology used by the military services and therefore resulted in rates that favored DLA. There is no apparent basis to demonstrate a significant bias either for or against DLA.

The opponents to the consolidation proposal also state that DLA has a significantly larger number of nonstocked items than the services which, by definition are excluded from availability rates; thus, DLA's performance appeared better than it actually was. Investigation found the exact opposite to be true. DLA does have a larger number of nonstocked items in its assigned inventory than do the services, however, the number of customer demands for nonstocked items is higher in the services than in DLA. The Army's Medical Command in Europe told the Investigative Staff that DLA does not aggressively followup with the medical item suppliers and significant delays in the receipt of these nonstocked items is being experienced. The Army performed this function more effectively when they had the responsibility. Under the OSD proposal, DLA will not be assigned any more medical items than it already manages.

The second aspect of supply support which concerns the military services is the pipeline "on time" performance. This performance indicator measures the time from the date a requisition is initiated until the date the material is received by the customer. DLA's pipeline performance rate for its overseas customers significantly exceeds that of the services as shown below.

Overseas Pipeline Performance FY 1981 (6 months)

Activity	Percent of On-Time Delivery
DLA ----------	79.8
Army ----------	69.1
Navy ----------	49.4
Air Force ----------	74.5
Marine Corps ------	59.4

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However, DLA's pipeline performance while less impressive is nonetheless believed quite acceptable for its Continental United States (CONUS) customers.

CONUS Pipeline Performance FY 1981 (6 months)

Activity	Percent of On-Time Delivery
DLA	75.1
Army	72.7
Navy	84.0
Air Force	70.9
Marine Corps	28.9

DLA's failure to achieve the highest percentage of "on time" deliveries to CONUS customers is related to a basic problem of distributing these items from DLA depots rather than military services' depots. DLA's performance is attributable to three factors:

-- The geographical location of the DLA inventories is not as conveniently positioned to the supported units as the services depots are.

-- The use of special contract air carrier services (LOGAIR) and QUICKTRANS, costing more than $100 million per year) by the Navy and Air Force decrease these services' order and ship time. DLA uses this service to a much lesser extent.

-- Issues of DLA-owned material from Navy supply points which were not counted in DLA's performance indicator. These would have high "on time" delivery rates which could be compared to the issues of Navy and Air Force material as stated below.

Air Force stocks are stored at five Air Logistics Centers. These centers are themselves users of a major percentage of the stocks because depot maintenance and overhaul missions are also located there. This situation will favor Air Force statistics for "on time" CONUS deliveries.

The Navy is involved in a similar situation with six Naval Supply Centers being collocated with major ship servicing facilities. The other six major Navy Supply Centers are collocated with units having major aircraft maintenance missions. This situation will likewise reflect favorably on the Navy's "on time" CONUS delivery statistics.

A key question to all of these considerations is, "where will the depot stocks be stored?" Since the proposal's initial savings

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are in the areas of (1) overhead personnel reductions and (2) improved procurement methods, the depots stocks should remain in their current locations. The implementation envisions that DLA will perform the functions of inventory management and procurement while the individual service's depot will continue to receive, store, and issue the consumable items they currently have responsibility for. However, to realize the full potential savings of this proposal, the DOD should be working towards the establishment of multipurpose depots. Currently, an Army unit in Texas has to go to Army depots located in Pennsylvania or California to obtain many of the items it needs while the Air Force may have a major depot complex only a few miles away. DLA has made some in-roads in this area by collocating its stocks at a Naval Supply Center at Norfolk, Virginia, and at Oakland, California, with similar efforts scheduled for the Air Force's facility at Randolph Air Force Base, Texas, in the summer of 1981.

The potential for savings and the possibilities for improved readiness are quite evident and the establishment of multipurpose depots DOD-wide should be the next step after the transfer of consumables to DLA.

Complexity of the Items to Be Managed by DLA

The military departments are concerned that the items they currently manage are far more complex and difficult to manage than those consumable items currently being managed by DLA. On the basis of the weapon systems applications and the technical characteristics of many of the service managed consumables, compared to those which DLA manages, the service managed items do tend to be more complex. However, the complex nature of the item is not synonymous with complexity of item management which is the key point.

The Defense Audit Service (DAS) reviewed this point in detail. The Army and Air Force argue that all of their consumable items are complex while the Navy indicated that only 161,000 of their 520,000 consumable items were complex.

Accordingly the DAS auditors, in coordination with the services, developed a list of 22 item characteristics which constituted a profile of items "complex to manage." The auditors then selected a statistical sample of "complex" items from each service. The results are shown below.

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SAMPLE OF COMPLEX ITEMS

	Army	Navy	Air Force	Total
Total Sample	407	393	432	1,232
Considered Complex:				
per Manager	55	40	81	176
per DAS Criteria	17	11	28	56
Conculsion:				
Within DLA Capability	407	393	432	1,232

DAS concluded that none of the service managed items were beyond DLA's capability to manage. However, in the event that a technical problem does arise which is beyond DLA's engineering capability, a procedure is in effect to cover this type of situation. Specifically, the joint regulation DLAR 3200.1--"Engineering Support for Items Supplied by the Defense Logistics Agency and the General Services Administration," clearly delineates the procedures for obtaining engineering support from the DOD component most knowledgeable of the item. The Director of Material at one Air Force Logistics Center stated that he has used this procedure as a basis for establishing a Memorandum of Understanding with a number of DLA Supply Centers to assure that engineering support is provided whenever needed. He stated that the procedure works well and he does not anticipate any problems in this area.

In addition to the DAS analytical effort and the Investigative Staff's operational level observations, there have also been some extremely high level interactions on this matter which are worthy of note. The Commander-in-Chief of the Strategic Air Command in a letter to the Secretary of Defense noted two examples of DLA's failure to be logistically responsive.

-- The first example involved radio tubes for the ARC-89 UHF (ultra high frequency) radio. The allegation stated that DLA procured unusable tubes from three different vendors on three different occasions thus crippling the Air Force's maintenance capability on the radio. Investigation confirmed that there was a problem with obtaining satisfactory tubes; however, it was determined that the tubes procured by DLA fully met the military specification provided to DLA by the Air Force.

-- The second example concerned a water tolerance coupling managed by DLA. The Air Force alleged that when problems occurred with the coupling, resolution took nearly a year, primarily due to difficulties with interagency communications (both organizations involved were commanded by Air Force general officers). The Air Force allegedly resolved the problem through in-house fabrication of the coupling. Investigation revealed that when DLA attempted to buy the coupling in 1977, the only known source had gone out of business. When DLA requested assistance from the Air Force

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engineering support activity in finding an alternate source of supply, the Air Force activity indicated that it knew of no alternate source of supply and recommended cancellation of the stock number. Doggedly, DLA developed a new source of supply but further delay ensued because of the contractor's 9-month production leadtime. In sum, it is doubtful that this problem could have been solved faster under Air Force management.

Subsequently, the Commander of the Military Airlift Command cited several examples of alleged poor support which, after investigation, could not be substantiated as "poor support." In fact one example, alleging poor DLA support of the C-130 throttle cable replacement problem is very difficult to comprehend in the light of the commendatory letter received by the DLA center from the Warner Robins ALC in February 1979, subject: Outstanding Support for C-130 Throttle Cable. This letter described the program to replace the cables as, "one of the most timely (and therefore, the most successful) in recent memory." The letter further noted, "that the success of this program was largely attributable to the outstanding support provided by you and your personnel."

Economic Analysis

The December 1978 OSD proposal to transfer consumables from the services to DLA estimated an annual savings of $124 million. The services took considerable issue with the factors used in the accompanying economic analysis to calculate this savings. Subsequently, the Defense Audit Service (DAS) was asked to validate the analysis. DAS performed a detailed audit of the economic analysis and determined that, "the annual savings should be between $62.9 million and $84.1 million." (emphasis added) However, the DAS audit was only based on a validation of the factors included in the original OSD consolidation proposal. The services were uniformly concerned that neither the original proposal nor the DAS evaluation had incorporated the guidance contained in DOD Instruction 7041.3 Economic Analysis and Program Evaluation for Resource Management.

Accordingly, the Defense Logistics Analysis Office was instructed to conduct a revised economic analysis using DODI 7041.3 and the most current data available. The results of this analysis are shown below.

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Annual Recurring Personnel and Cost Reductions

Operational/Direct	Personnel	Cost (millions)
Services - Decrease	6,132	$138.5
DLA - Increase	-2,436	-51.6
Net Recurring - Decrease	3,696	$ 86.9
Support/Indirect		
Services - Decrease	648	$ 11.1
DLA - Increase	-316	-5.4
Net Recurring Support - Decrease	332	$ 5.7
Total Recurring Savings - Decrease	4,028	$ 92.6 (1978 dollars) $114.0 (1980 dollars)

On July 7, 1981, the Deputy Secretary of Defense directed that 200,000 consumable items should be transferred to the Defense Logistics Agency. The transfer is to be accomplished within 6 months. Following the transfer, OSD will evaluate the situation and determine if it is desirable to move additional items.

Investigative Staff's Observations

The services can interminably rebut, or disagree with any economic analysis performed by any organization regardless of qualifications. It is virtually impossible to perform the finite analysis the services will continue to insist on. The Investigative Staff feels that there is sufficient data and evidence upon which to make a decision on this matter. The services' arguments against the proposal are parochial, and at times even emotional. The time has come to "fish or cut bait."

There are a number of management considerations that deserve attention and emphasis in accomplishing the proposal to transfer management of 1.3 million consumable items from the military services to DLA. However, in view of the magnitude of the estimated annual savings in direct costs of between $63 million and $124 million, and in view of the Secretary of Defense legal responsibility to, "take appropriate action (including transfer, reassignment, consolidation or abolition of any function, power or duty) to provide more effective, efficient, and economical administration and operation and to eliminate duplication in the Department of Defense;" it appears that the proposed realignment of management for all consumable items should be directed for implementation without further study or delay.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

On July 7, 1981, Deputy Secretary of Defense Carlucci approved the transfer of an initial increment of 200,000 consumable items from the Military Services to the DLA. Secretary Carlucci's decision memorandum also established a Steering Committee to oversee the transfer and a Joint Implementation Group (JIG) composed of Service, DLA, and Joint Chiefs of Staff representatives to develop an implementtion plan. The implementtion plan was completed subsequently by the JIG and approved by the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics (ASD(MRA&L)) on October 9. The plan provides for the transfer of the first item in April 1982 and the last item in October 1982. Secretary Carlucci's decision memorandum indicates that, following the transfer of the 200,000 items, we will evaluate the situation to determine if it is desirable to transfer additional items.

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Report of September 23, 1981

INVENTORY CONTROL, THEFT, AND LOSS OF EQUIPMENT

The Committee directed that an inquiry be made into the procedures and effect of inventory control, theft, and loss of equipment, clothing supplies, parts, etc., at all levels within DOD.

DOD makes adjustments to its inventories valued at billions of dollars each year. These adjustments have been noted in numerous reports by GAO and the various DOD audit agencies. The losses have generally been attributed to (1) weakness in supply management of equipment under control of the services, (2) highly inaccurate financial inventory report data, (3) the use of tens of thousands of codes involved in processing transactions through supply and financial records, (4) high turnover rate for personnel involved in complex supply and financial systems, (j5) physical inventory adjustments, (6) losses in transit, and (7) reported theft.

The Investigative Staff directed its attention to the procedures used by DOD to control or account for cargo/items which enter the Defense logistics pipeline. These procedures were found to be confusing, conflicting, and poorly coordinated. As a result, millions of dollars of Defense cargo is routinely reported as "missing" and little, if any, effort is made to resolve these discrepancies. Additionally, the Investigative Staff has obtained strong evidence that the confusing nature of the DOD cargo accountability procedures is causing many activities to ignore the reporting procedures and thus, the extent of the total losses cannot be fully determined. This section will (1) discuss these procedures; (2) demonstrate the confusing nature of the applicable directives; (3) show, to some extent, the impact on the system; and (4) provide some insight as to how the system can be corrected.

Accountability for DOD Property Shipped From Contracting Plants Is Seriously Deficient

The chain of events in the shipment of Government cargo from thousands of contractors' plants is fraught with vagaries and little assurance that Government representatives actually see the cargo for which the Government is being billed. Specifically, the Defense Contract Administration Service (DCAS) is tasked to provide certification that specific material has been received from a contractor in accordance with a procurement document. This mission is actually performed by DCAS-assigned Quality Assurance Representatives (QAR). Each QAR is routinely assigned several contractors as a responsibility. One of his prime tasks is to certify on the DD Form 250, Material Inspection and Receiving Report, that a particular shipment meets the contract specifications and that it has been received in good order by a Government respresentative. This form is critical to the contractor since it must normally accompany his invoice for payment at the Government finance office.

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Each contractor will normally make numerous shipments daily to various Government activities. It is physically not possible, in most instances, for the QAR to be at all of his assigned plants at the time of shipment. The matter is further complicated as the property moves from the vendor's plant to an overseas customer, changing hands between and among various commercial and military activities involved in the transportation process. For example, a contractor can load a small Government shipment on a commercial truck. This shipment would normally be taken to a consolidating warehouse for onward shipment by a different commercial trucker and then to a military port facility. At this point, the Government arranges for the shipment to be moved by a commercial ocean freighter to an overseas processing point. The shipment will finally be delivered to the overseas customer by either commercial or military transportation.

DOD has several procedures which are used to try to resolve the inevitable accountability problems which are associated with the movement of shipments through the Defense logistics pipeline.

Procedures Used to Account for DOD Property in the Logistics Pipeline Are Confusing and Contradictory

DOD has several programs which are used to report losses and discrepancies for cargo moving in the Defense logistics pipeline. The Investigative Staff looked into the three following programs.

> The Transportation Discrepancies in Shipments Reporting (DISREP) system establishes the requirement to document transportation-type discrepancies in shipments for the purpose of adjusting property/inventory records of the appropriate accountable activity and to process claims against the common carrier responsible for the loss or damage to Government property.
>
> Reporting of Discrepancies (ROD) system establishes the policies and procedures prescribing the methods and conditions under which item discrepancies, packaging discrepancies, and discrepancies in parcel post shipments are reported and replies furnished.
>
> The Military Standard Billing System (MILSBILLS) is used to provide standard automated procedures and formats to be used by DOD components for billing, collecting, and related accounting for sales of material from supply system stock, including direct deliveries from commercial vendors. These standard procedures will also provide a mechanized means for processing, billing, and collection actions for General Services Administration (GSA) sales to DOD components.

The determination of which of the above reporting systems to follow in reporting a loss is covered by regulations which are

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confusing in themselves, conflict with each other, and often lead to failure of defense activities to report anything at all. Specific examples of the confusing regulations are shown below.

Transportation Discrepancies in Shipments Reporting (DISREP) System

According to a joint regulation of the military services and the Defense Logistics Agency, the following procedures govern the reporting of transportation-type discrepancies. The regulation states in paragraph 1-5b: "When transportation is for the account of the Government formal documentation is not required to report damaged or astray freight, partial loss, overages and shortages, when the known dollar value is less than $50 ($25 or less on GSA shipments).

(1) Per bill of lading or governing transportation document in CONUS shipments or oversea shipments moving on a TGBL or in intratheater movements.

(2) Per shipment unit via all modes for oversea shipments other than in (1) above.

Note: To determine if dollar value is $50, total all applicable factors of property value, repair cost, replacement cost, and/or unearned freight charges resulting from the discrepancy except when premium transportation is requested and billed to the requisitioner, shipments of stock items (from GSA facilities or directed by GSA from a vendor) are f.o.b. destination with the freight charges included in the price of the material. Therefore, unearned freight charges should only be computed on nonstock items shipped from a vendor or contractor where the material is purchased f.o.b. origin by GSA."

The regulation states further that formal notification is required:

"(1) On damaged or astray freight, partial loss, on overages and shortages, when the dollar value is unknown or is $50 or more (more than $25 on GSA shipments) within guidelines indicated in b above. This includes discrepancies involving shipments in commercial or Government owned (or leased) shipment containers (SEAVAN's) and similar containers moving under Military Sealift Command agreements and received with seals intact when the actual contents of the SEAVAN/container do not agree with contents indicated on transportation documents.

(2) When, regardless of dollar value, the following conditions occur, or are noted:

(a) Discrepancies in shipments moving on prepaid CBL for the account of the vendor/contractor on an f.o.b. destination basis. * * *"

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The selection of the proper discrepancy form to be used is also confusing under this directive since it appears that different forms could be used for reporting the same type of discrepancy. For example, on page 1-1 of the directive, it provides for the use of another form (SF 364) to report discrepancies in packaging, item discrepancies in shipments determined to be a responsibility of the shipper and on lost or damaged parcel post shipment.

Page 2-1 of the same directive states that:

"* * * SF 363, or DISCON message, as applicable, and SF 361 will be used by transportation officers or their authorized agents to report transportation-type discrepancies in connection with the movement of material as set forth in this chapter.

Overages or shortages (when transportation documentation and contents do not agree) detected in carload, truckload, or container shipments received at transshipment point or at destination with seals intact will be considered a transportation discrepancy reportable on the DISCON or DISCON message, as appropriate, with subsequent documentation by DISREP." (emphasis added)

Discrepancy in shipment reports become a basis for submitting claims against carriers by service finance offices in an attempt to recover monetary losses. The service finance offices provide the Military Traffic Management Command (MTMC) with a summary of claims submitted for DOD. A summary of claims against carriers follows.

SUMMARY OF CLAIMS

	FY 1979	FY 1980	First 6 Months FY 1981
Number of Claims			
Shortages	2,847	3,780	897
Theft and Pilferage	106	49	41
Other Types	1,454	2,855	1,422
Total	4,407	6,684	2,360
Dollar Amounts Involved			
Shortages	$2,232,789	$2,990,849	$ 992,570
Theft and Pilferage	42,536	10,164	33,017
Other Types	1,477,235	1,969,442	771,641
Total	$3,752,560	$4,970,455	$1,797,228

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The data presented above represents the claims action initiated by the service finance office but does not show actual collections.

According to data obtained by the U.S. Army Finance and Accounting Office, dollar recoveries for claims settled during FY 1980 for for the Army, Air Force, and the Defense Logistics Agency totaled over $6.7 million. Due to the inherent time lag between submission of claims and actual collection, no direct correlation of claims and collections can be made for any given year.

Report of Discrepancy

The Report of Discrepancy (ROD) program of DOD is governed by a joint regulation of the military services and the Defense Logistics Agency (DLA). The program requires the preparation of Standard Form 364 by a receiving activity when property is not received or is received damaged, misidentified, unserviceable, or with other conditions which are caused by shippers. These reports require shippers to provide receiving activities with appropriate financial adjustments or replacements for funded items. Unless discrepancies are reported, additional funds will be required to reprocure items or to replace missing shipments.

The ROD program requires that discrepancies on shipments from contractors will be reported regardless of value. Some of the other types of discrepancies which should be reported include:

-- When discrepant conditions are valued in excess of $50 per line item.

-- Are valued in excess of $25 per line item on shipments from a DOD source of supply to customers outside of DOD and from a GSA source of supply to DOD customers.

-- Shortages valued in excess of $50 per line item, except classified and protected items which will be reported regardless of dollar value.

-- Receipt of erroneous material, unacceptable substitutes, or duplicate shipments, regardless of dollar value.

-- Material received is valued in excess of $50 per line item for cancelled (confirmed only) requisitions--a copy of the confirmation of cancellation is required.

-- Items valued in excess of $50 per item reported shipped by parcel post and not received or received in a damaged condition.

An example of the confusion on the $50 criteria per line item is the question of whether or not to submit an ROD under the following circumstances. Is an ROD required to be submitted on a single line item of (1) one each valued at $40, (2) two each valued at

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$40 for a total of $80, or (3) three each valued at $40 for a total of $120?

A senior official responsible for writing the regulation and many others at field stations have stated that the regulation is indeed confusing and provided the following information to the Investigative Staff. Shortages of $50 should be reported. For shipments within DOD, shortages under $100 are absorbed by the customer. On the matter of the line item value discussed above, an official responsible for the regulation told the Investigative Staff that the following should happen (although not specifically covered in the regulation):

-- One line item costing $40 each, no ROD should be prepared and the customer absorbs the loss.

-- One line item of two each costing $40 each for a total of $80, a ROD should be submitted but no credit is granted to the customer if the shipment is within DOD.

-- One line item of 3 each totaling $120, a ROD should be submitted and credit may be given to a customer after investigation of the loss.

Evidence of the confusion that reigns in the field was demonstrated by a field trip to Europe by the Investigative Staff where we noted that out of 17 field activities reviewed on the question of ROD's, only 2 of the activities were able to demonstrate that they knew what items to report, on which form, and to the proper document processing activity.

In the Air Force, more than 13,000 ROD's were initiated by 22 Air Force activities for shipper reimbursement or correction during the 6-month period ending April 1980. Air force auditors estimated that in April 1980 alone, Air Force bases did not prepare at least 3,000 reports of discrepancy for property valued at $1.8 million. When ROD's are not prepared, discrepancies cannot be corrected, shippers supply records cannot be properly adjusted, and funds could be expended to reprocure funded items or missing items already in the inventory.

An Army study of 6,730 ROD's prepared during the period June 1 through November 30, 1980, noted that 58 percent of the ROD's were for shortages which had a material value of nearly $4 million.

The Army study did not indicate either the estimated number of ROD's which had not been submitted or the approximate value of any potential loss which may have been experienced by the Army.

Information on the magnitude of ROD's handled by the Navy is sketchy at best. For example, the Ships Parts Control Center (SPCC) located at Mechanicsburg, Pennsylvania, advised the Investigative Staff detailed information and summary data on ROD's is not maintained. ROD's are handled on a case-by-case basis but information

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is not available which would show the types of ROD's involved or the dollar value of losses which may have been incurred.

At the Navy's Aviation Supply Office (ASO), located in Philadelphia, the Investigative Staff was advised that 2,401 ROD's were processed through the ASO during the period February through July 1981. Out of the 2,401 ROD's processed, the ASO had responsibility for 124 ROD's valued at $373,549. The remaining 2,277 ROD's with an unknown dollar value were merely passed through ASO channels to shipping activities for action.

Military Standard Billing System (MILSBILLS)

Under the provisions of MILSBILLS, the seller will promptly review and investigate a reported discrepancy from a DOD activity and forward a response to the reporting activity indicating whether a billing adjustment will or will not be authorized, and when appropriate, process the adjustment. Adjustments will not be processed when the loss or gain involved is less than $100 per line item. Loss and gains valued at less than $100 per line item will be absorbed by the billed office. The ROD and DISREP systems discussed elsewhere in this report stated basically that ROD's will not be processed for items costing less than $50 and transportation discrepancies (DISREP's) will not be processed for items costing less than $50 (there are exceptions to both limitations).

Based on interviews with personnel at the headquarters level and various operating levels, the Investigative Staff believes that many discrepancy reports of whatever type are not submitted because of confusion with the basic regulations and failure of the services to designate a specific logistics function to be responsible for the preparation of these reports. For example, personnel in the operating levels are not sure of the dollar values which apply and consequently do not know whether or not to submit a ROD, a MILSBILLS, or a DISREP. Further, Air Force supply procedures do not assign specific responsibility for the initiation of reports of discrepancy.

The failure of DOD to provide the services with consistent and easy to understand procedures must inevitably lead to losses of material at a value not truly known.

Inventory Control

Inventory control at various DOD supply activities continues to require billions of dollars in inventory adjustments. These adjustments could lead to higher budget proposals which are based on inaccurate data and, in turn, may lead to the appropriation of funds for the purchase of supplies and equipment which would be unnecessary if more prudent and effective supply management practices were followed. Details for each of the services follows.

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Army

The U.S. Army Material Development and Readiness Command (DARCOM), the largest inventory manager in the Army, reported the average value of its inventory during FY 1980 to be nearly $15.9 billion. During the same period inventory adjustments showed a net loss of $24.6 million out of about $950.8 million of adjustments, $463.1 million in gains and $487.7 million in losses.

Although DARCOM data shows a net inventory loss of $24.6 million, there was no information available which would indicate the cost of theft of material from DARCOM activities.

Navy

The Navy has a long and continuing problem of financial control over its inventories. Since 1966, the Navy Auditor General has issued more than 80 reports showing that the Navy's financial inventory report data is highly inaccurate due to numerous different types of problems and/or errors that occur in both the financial and supply system records. In its most recent report of February 2, 1979, the Navy Auditor General stated the Navy financial inventory report showed an inventory of $13 billion as of the end of FY 1979. During the same year a total of $29.3 billion inventory gain and loss adjustments were noted in the financial inventory report. Many of these adjustments were required to correct the use of wrong codes or wrong combinations of codes. According to the Navy audit report, at least 10,000 codes are involved in processing transactions through supply and financial records. Since the turnover rate for personnel involved in these complex supply and financial systems is reportedly high and the number of codes is so voluminous, it appears that gargantuan inventory adjustments are part and parcel of the complexities built into the system.

In an effort to comply with the Naval Audit Service (NAS) report's recommendation, "* * * to revise the inventory accounting system, including the supply system procedures that directly affect the financial inventory report, with a view to developing a more simple and direct financial control system that will provide more accurate and meaningful financial data," the Navy awarded a contract for $50,000 to Booz, Allen, and Hamilton, Incorporated, to review the systems and make recommendations to correct conditions disclosed by the audit report. One of the items in the contract called for an examination and evaluation of the potential for combining the supply and financial accounting into a single data source.

The Booz, Allen, and Hamilton contract was completed in August 1980 and the Navy is currently in the process of implementing the contractor's recommendations. In addition to the Navy's own efforts, it has issued requests for proposal for (1) a feasibility study of adopting the stock fund general ledger at the inventory control points (ICP) or at ICP's and stock points and, (2) if desirable, incorporate it into an integrated supply/financial data base. It appears that studies beget studies ad infinitum.

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Air Force

The Air Force Logistics Command (AFLC) had sales from stock and industrial funds of $8.74 billion during FY 1980. During the same period, AFLC made 170,756 inventory adjustments with a total gross value of $194 million. Of this amount $92 million was for inventory increase and $102 million was for inventory decrease--a net decrease of $10 million.

Marines

Out of a total inventory of over $2.7 billion, the Marine Corps made a total of $87.7 million in physical inventory adjustments resulting in a net gain of over $8.8 million during FY 1980. During the same period accounting adjustments totaled $165.3 million for a net gain of over $9.4 million.

Defense Logistics Agency

The Defense Logistics Agency (DLA) had sales of nearly $10.8 billion during FY 1980. During the same period, DLA had physical inventory adjustments of $222.8 million, which included $117.1 million in gains and $105.7 million in losses, for a net gain of $11.4 million. These adjustments are the result of differences between stock records and book balances, adjustments made to vouchers and inspection reports, and differences in transfer documents.

In FY's 1978 and 197 the Defense Personnel Support Center, major DOD supply center of DLA lost control of hundreds of millions of dollars in stock funds. The center made adjustments of about $566 million in an attempt to correct its financial records but the validity of most of these adjustments could not be determined because of inadequate documentation.

These accounts were certified as correct by officials at the center despite their knowledge of the center's financial problems.

Theft and Loss of Government Property

During the course of its review the Investigative Staff noted a number of significant instances where Government property was stolen, unaccounted for, or misappropriated. These examples follow.

Army

In October 1977, the Army Inspector General (IG) reported that large quantities of material were unaccounted for and pinpointed a number of weaknesses in material accountability. The Inspector General estimated the value of the Army's property book to be about $12.5 billion. The IG's inventory analysis indicated about $118.5 million of this material could not be accounted for and about $89 million of material was on-hand but not on the accounting records. This resulted in a net loss of $29.5 million.

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In January 1981, the Army's Criminal Investigation Division (CID) noted that spark plugs valued at $12,855 could not be accounted for over a 2-year period. Some tires and spark plugs ordered were not the type that fit the installation's vehicles. Some signatures were apparently falsified.

Navy

According to a GAO report, two Navy bases in California, established accountability procedures for equipment were generally adequate but they were not always followed. Physical inventories were not always taken as required and in some instances physical security was inadequate. For example, accountability practices at the Miramar Naval Air Station, San Diego, California, disclosed various discrepancies in accountability, inadequate physical inventory practices, failure to document equipment transfers, and failure to safeguard item from weather or theft. One example of improper accountability and equipment transfer involved the shipment of a $34,000 test set to a deployed ship without documentation.

Many items of equipment on hand at Miramar were stored in a little-used, dilapidated facility, the interior of which was wet from recent rains. There was no record of the items stored in the building and several items thought to be stored there could not be located. In summary, over 9 percent of the 3,201 items sampled at Miramar and Port Hueneme, Oxnard, California, were found to be discrepant.

To further demonstrate how lax procedures can lead to criminal activity, the following is provided.

In November 1980, the Navy's Investigative Service discovered jet engine parts at a scrap dealer. It was subsequently discovered that a Navy employee was responsible for the theft of the property valued at $295,000.

Air Force

A GAO audit conducted during April 1979, at March AFB, California, showed that accountability was weak for items having a value of $1,000 or less. For example, out of a sample of 639 items audited, there were 19 instances of shortages. These shortages included three typewriters valued at $480 each and three adding machines valued at $376 each. A projection of this sample showed that March AFB had incurred a total loss of about $160,000 at the time of the audit.

In November 1980, the Air Force's Office of Special Investigations (OSI) found that a Spanish contractor had misappropriated more than $53,000 worth of DOD heating fuels by altering receipt and issue documents.

During FY 1981, the Air Force's OSI found that a Government employee ordered a large quantity of electronic parts, ostensibly

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for an air field control tower project. However, the project had been completed 4 months previously. It was suspected that the parts were used to develop and maintain equipment sold by the employee's private electronics company.

Marines

Theft and loss of Government property recorded by the Marine Corps during FY 1980 amounted to over $211,000 in theft and over $285,000 in transportation losses. At the time of this report, there was no information available to show what amounts of money, if any, had been recovered.

A GAO review of accountability for tools at Camp Pendleton, California, showed that implementation of control procedures varied from poor to very good. Although local procedures called for monthly inventories of toolboxes, records of one battalion showed that inventories were not being done that frequently and that the effectiveness of the inventories which were performed was questionable. For example, one toolbox was inventoried on May 8, 1979, and reported to be short 14 tools. At the request of GAO auditors, the same tool box was reinventoried on May 16, 1979, and found to have 39 tools missing.

Because of the large variance in the number of tools missing, the validity of the earlier inventory is suspect. Significantly, this battalion had the highest turnover rate for tools. It purchased tools equal to 148 percent of its average inventory during a 12-month period. In summary, over 7.5 percent of the 3,302 items sampled at Camp Pendleton were found to be discrepant.

Defense Logistics Agency

The extent of loss and theft of Government property handled by DLA during FY 1980 is as follows.

	(In Millions)
Dollar loss on shipments to customers ------	$11.6
Dollar loss on incoming shipments (net) ----	23.7
Inventory loss due to shrinkage, theft, contamination, and deterioration ---------	6.4
Total ----------	$41.7

On April 17, 1981, the Federal Bureau of Investigation (FBI) and the Defense Investigative Service announced the arrest of 21 employees of DLA's Defense Depot, Memphis. These arrests followed an 8-month undercover investigation utilizing an undercover FBI agent posing as a truck driver. The agent made periodic buys of

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equipment from the depot's employees which totaled an estimated $113,000 and included the purchase of a forklift truck. The name of the undercover trucking company was "TGP Lines," which stands for Theft of Government Property Lines.

Investigative Staff Observations

Clearly, these examples are only the "tip of the iceberg" of the actual and potential loss of DOD property due to poor accountability, theft, and misappropriation. However, they are sympomatic of the lack of workable, effective, and understandable procedures to account for and control the use of DOD property. Also, few DOD personnel appear to relate to Government property as having a dollar value (except for those who steal it).

DOD Needs a Thorough Review of Its Property Accountability Procedures

It is clear that some DOD procedures used for the accountability of its property are confusing, contradictory, and poorly coordinated. As noted previously, even the author of one of the primary property accountability regulations found his and the related regulations to be confusing. The Investigative Staff found that this confusion extended from the Inventory Control Points down to and including individual combat support units in Europe.

In order to improve this situation, DOD must take aggressive action to remedy this situation. A thorough review must be made of all the regulations relating to the control and use of Government property. These regulations must be revised and adhere, as a minimum, to the following characteristics:

-- Simplicity--they must be written in such a manner that even the lowest graded soldier or civilian employee can understand them since it is at this level that these procedures must be implemented.

-- Clarity--the procedures must be stated in such a way that they are clearly understood with little or no confusion as to what items should be reported and what activity should receive the report.

-- Fully Coordinated--these procedures concerning the control and use of Government property must be fully coordinated so one regulation does not contradict or negate instructions stated in a related procedure. Ideally, DOD should issue one instruction which would cover all elements of transportation, inventory control, and financial accountability for all DOD property.

-- Command Supported--the old axiom that "people do well only those items which the boss checks" certainly applies here. Commanders at every level must show concern for the security and accountability of DOD's property. Incentives must be built into the accountability system so that the supply, transportation, and financial clerks will want to report discrepancies.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

Inventory control, theft, and loss of equipment was a major concern of the report. It was noted that procedures used to account for DOD property in the logistics pipeline are confusing and contradictory. We would agree that clarity is needed. However, actions which are already underway to improve the procedures are not mentioned. The joint regulation "Reporting of Transportation Discrepancies in Shipments", has been completely revised and staffed by the Military Traffic Management Command (MTMC), and will be published shortly. DLA has specific improvement actions slated for Report of Discrepancy (ROD) system and the Military Standard Billing System (MILSBILLS).

Additional comments on DLA's losses of $41.5 million in stock fund owned material are contained in an insert for the record for the House Appropriations Committee Hearings of 5 October 1981 which was attached to our letter of 23 November 1981. Also see page 165 of the hearing record (Part 9).

DLA had losses totaling $41.5 million during fiscal year 1980 in stock fund owned material. These losses arose from a variety of reasons including losses due to shrinkage and theft, accounting adjustments and losses on incoming shipments. In the category of losses due to shrinkage and theft, the principal commodity involved was fuel ($4 million of a total of $6.4 million). The remainder of the losses in this category were for subsistence. We have programs in place designed to minimize such losses.

Accounting Adjustments: DLA had net accounting adjustments during fiscal year 1980 of $11.1 million. This net adjustment was driven by a substantial loss in the medical commodity for albumin which we discovered had exceeded its shelf life and thus had to be withdrawn from the inventory.

Loss on Incoming Shipments: During fiscal year 1980 we closed our depot operation at the Defense Electronics Supply Center in Dayton, Ohio, and redistrubuted the inventory positioned there to Richmond and Norfolk, Virginia. During this move, $12 million in inventory which left Dayton failed to arrive at destination. We do not, at this time, know if the apparent loss was the result of faulty paper work (locator records at Richmond were not satisfactorily accurate; in clearing them up, much material has been "found") or if a real loss did, in fact, take place.

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The remaining item in this category was $10.6 million for fuel. Fuel is very volatile in nature and some losses are unavoidable in handling and storage. Losses will vary depending upon such factors as the volume handled, prevailing weather and the type and condition of tanks and equipment. Because of that, allowable loss factors have beens established which, based on a recent Defense Audit Service review, are acceptable. Any loss above these acceptable standards requires absolute verification of circumstances by responsible officers (including physical observation and investigation, and validation of documents and records). The fuel inventory is about $4 billion dollars, and the annual purchases are about twice that amount.

In summary, the reported losses have management visibility and programs are in place to minimize losses to the government. While we do not believe that fiscal year 1980 losses were inordinate--they represented .4 percent of sales and .6 percent of inventory--certain of the "losses" are under investigation, and if circumstances warrant, the Defense Investigative Service will be brought in for a formal investigation.

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Report of September 23, 1981

DOD INCONSISTENCIES IN THE HANDLING OF GOVERNMENT FURNISHED SPECIAL TOOLING

In concert with Committee's desires that a survey be conducted of the management of Government-owned equipment, supplies, and spare parts in the custody of procurement and maintenance contractors, the Investigative Staff has conducted an inquiry into this area.

The Investigative Staff has found that DOD and the individual services have been inconsistent in their handling of contract provisions for "special tooling" used in the contractor's manufacturing process. This has resulted in millions of dollars of special tooling (with no foreseeable use or need) being stored at contractor's plants, with costs to DOD of millions of dollars.

Special Tooling Worth Hundreds of Millions of Dollars Is Currently in the Hands of Contractors

The Investigative Staff has learned that during the productive life of many major acquisitions and even beyond that time, substantial contractor and Government manpower is used in the administrative accountability of special tooling, its storage, and disposal, costing the Government many millions of dollars. For example:

-- One contractor plant visited by the Investigative Staff has over $30 million in special tooling lying idle which could be excessed or otherwise disposed of.

-- Another contractor charges the Navy almost $100,000 a year to store special tooling for which there is no apparent need.

-- A recent study revealed that for five out-of-production aircraft programs, storage and control costs exceeded $750,000 for unneeded special tooling.

-- Another major aviation contractor still retains special tooling, at Government expense, for a dormant aviation program based on the possibility a foreign military sales program customer might need a part.

-- One Air Force logistics center wants to keep the special tooling for the F-4 to build spare parts that have not yet failed.

Special Tooling Options Create a Procurement Dilemma

Special tooling are those items of tooling or equipment which are of a specialized nature that without substantial modification or alterations have a limited use in the production or development

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process. When awarding major weapon systems contracts which have a requirement that the contractor manufacture or acquire a significant amount of special tooling, the Defense Acquisition Regulation (DAR) provides the contracting officer with two options. The first is for the Government not to acquire title to the special tooling. The second is to acquire title or the right to acquire title at a later date. Each presents the contracting officer with a dilemma.

It is the basic DOD policy that the contractors provide and retain title to special tooling that is needed in the performance of DOD contracts to the extent that it is consistent with sound procurement practices. This has the advantage of placing the administrative responsibility for the storage, accountability, and the ultimate disposal of the special tooling with the contractor. The Government, of course, will pay the costs indirectly in the contract price. It does make the contractor, in effect, a sole-source supplier. This all but eliminates competition for the follow-on procurement of the major system or for spare parts.

When the Government acquires title to the special tooling, a potential is created for time and monetary savings. Under this option, it is easier to create competition for the follow-on procurement, as the initial cost for the tooling has already been paid. However, special tooling procured under one contract may be unsuitable for use on follow-on contracts. Tooling from the first contract may only be useful for the procurement of spares or the special tooling could be designed around manufacturing techniques and equipment which may or may not be compatible with those of another potential supplier.

The contracting official has the responsibility of selecting the right option for each situation. The wrong decision can be costly. The Investigative Staff learned that one service contracted to acquire title to the special tooling used in a major acquisition. Subsequently, it was decided to give title outright to the contractor for the tooling. However, when the service attempted to develop a new source for spare parts, it found itself in the position of being unable to negotiate a reasonable user fee for the special tooling with the original contractor so that a competitive vendor could produce the desired spare parts.

Life Cycle Agreements

It has been suggested that DOD make a new method of contracting available to procurement officials to provide for special tooling. That is, that title to special tooling be given to the contractor in return for a life-cycle support agreement for procurement of like systems and supporting spare parts even after all major end items are delivered. This agreement would be set for a specified (negotiated) number of years and replacement costs for the tooling would be borne by the contractor. This would reduce the inordinate administrative costs now being incurred on DOD contracts. However, this method would eliminate any future chance for competition and make DOD the captive of a sole-source supplier.

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Investigative Staff Observations

Special tooling is a necessary element of DOD contracting for weapon systems. The contracting official has the responsibility of deciding whether to acquire or not to acquire title. In either case, the Government pays for the tooling either directly or indirectly. However, acquiring title to special tooling results in extra administrative costs. Since tooling may become obsolete, the contracting official should consider each piece carefully. Stability of design, the proposed manufacturing technique, and anticipated future requirement should be evaluated to insure that the huge administrative costs justify the storage and accountability of these items during periods of nonuse. Once a program is over, DOD should insure that prompt disposal of the special tooling is made to prevent unnecessary accumulation of administrative costs for its storage and accountability.

The Investigative Staff believes that the issue of special tooling in DOD contracting for weapon systems is a complex issue which needs a more detailed study. The study should include an assessment of the total magnitude of the problem and viable solutions to the problem need to be developed.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

This problem was said to result in millions of dollars of special tooling with no foreseeable use or need being stored at contractor's plants, with costs to DOD of millions of dollars. Steps are being taken to address this problem. For example, based on a GAO study dated 7 October 1981 on this subject, the Army directed its major subordinate commands to review their specialized tooling screening practices to insure that proper procedures are being followed. The Army's largest command, DARCOM, has published Circular #715-9-81, titled Procurement Instructions, dated 16 November 1981 which provides subordinate commands with guidance on the retention of unneeded Government-owned special tooling by contractors which caused unnecessary costs.

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Report of September 23, 1981

LACK OF CONTROL OF GOVERNMENT FURNISHED MATERIALS BY THE SERVICES IS COSTING MILLIONS OF DOLLARS ANNUALLY

Despite a Congressional instruction, the military services continue to be negligent in their control of Government furnished material (GFM) and are providing equipment worth millions of dollars yearly to contractors whose inventory controls are inadequate to provide the proper records and control of its use. The services have not yet established procedures as mandated by Congress and, as a result, have not gained visibility of the amount of GFM that contractors possess. This lack of visibility has resulted in widespread over-requisitioning, uneconomical requisitioning, unauthorized use of GFM and lack of proper inventory controls of GFM causing a loss of millions of dollars to DOD.

The DAR allows the Government to furnish material to contractors when it is determined to be in the best interest of the Government by reason of economy, standardization, the increased production, or other appropriate circumstances. This most commonly occurs in Maintenance and Overhaul (M&O) contracts.

Contractors can acquire GFM from the DOD supply systems by requisition or transfer. The official accountable records for the property are maintained by the contractor as a part of their property control systems. A Government property administrator is required to conduct periodic tests of the contractor's property control systems as a technique to assure that adequate inventory controls are used by the contractor to protect the interests of the Government.

Numerous Audits Have Pointed Out GFM Deficiencies

During the past several years numerous audits and studies have identified a number of deficiencies including:

(1) unauthorized requisitioning of supplies by contractors from Government supply sources,

(2) over-requisitioning of material,

(3) lack of accountability of GFM shipments,

(4) excessive number of requisitions,

(5) abuse of priority designators,

(6) unreasonable issues of Government owned material,

(7) GFM being used on commercial work,

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(8) inadequacies in material control,

(9) no records of issues,

(10) lack of cost effectiveness in the use and acquisition of GFM, and

(11) excessive spares on hand at contractor plant, when aircraft were not operational because of the unavailability of these spares.

A recent GAO report found that while the Navy was providing billions of dollars of GFM to contractors for use in constructing, overhauling, and repairing Navy ships, they (Navy) did not know the amount of GFM in their contractor's possession because there were no overall financial or other management systems to account for these materials.

GFM Dollars Cannot Be Easily Identified

An Air Force audit identified an overhaul contractor who was not preparing the documents required to account for GFM. Thus, Air Force item managers were neither aware of nor had visibility of those assets. As a result of the audit, $316,000 of excess GFM was identified and used to fill requirements on other commercial contracts.

The audit also identified $950,000 of excess GFM charged to one contractor but in possession of another contractor. GFM was issued as initial spares for a maintenance program which did not materialize. Although the item managers were aware of GFM, they did not know it could have been used to satisfy other demands.

The Investigative Staff requested from three major Army commands the amount of GFM that had been provided to contractors on active M&O contracts. While these commands had contracts worth billions of dollars, only one could provide an exact dollar amount of GFM issued, the other two commands stated that they would have to go to the individual contractors to obtain the figures.

DOD and the Services Slow to React With GFM Controls

Congress, through the House Appropriations Committee, has addressed the problem of the lack of control over GFM which was allowing contractors to utilize and requisition GFM in an uneconomical, wasteful and fraudulent manner. The Committee's FY 1979 report requested DOD to resolve the problem by allowing the contractors' use of the DOD supply system with the understanding that they (the contractors) would pay cash on the delivery of GFM when received from the supply system. DOD deferred, citing legal barriers to selling GFM to contractors. These impediments were removed in FY 1980 DOD Appropriations Act (P.L. 96-154, Sec. 767, December 12, 1979). DOD then proceeded to develop a test program

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to measure the effectiveness of selling GFM to contractors. This pilot program has developed snags since it was difficult to find contractors to participate. Five out of six contractors solicited by a Navy ICP refused to participate in the test program. Additionally, the services stalled in their development of the program. As of June 1981, only one contract had been signed by the Navy, with several others in the negotiation stage. The Army has only selected one system for the pilot program and is not yet near signing a contract. The first results of the pilot program will not be available until 1982, with final results available in 1985.

DOD has issued new instructions (DODI 4140.48, dated March 3, 1981) to control the access to GFM by maintenance contractors. These instructions require DOD components authorizing the use of GFM by a minimum of two contractors to establish a Management Control Activity (MCA) which is tasked to (1) maintain control over all contractor access to DOD's supply systems, (2) establish guidelines to validate contractors' requests, (3) maintain a contract, requisition, and shipment status file, and (4) provide a status report to DOD on all contractors' GFM requests. This regulation, which took effect 120 days from date of issue, requires semiannual reports for the periods ending June 30 and December 31. However, the Investigative Staff has found that the major commands have not yet received the DOD instructions. This, of course, will delay implementation and the subsequent reporting. Moreover, as officials of one Army command stated, the DODI (4140.48) cannot be fully implemented until changes are made to four other regulations.

Investigative Staff Observation

While DOD and its components have finally responded to Congressional urging to establish controls over contractors' use of GFM, it will still be sometime before the new regulations are actually implemented and an even longer time before the results of the pilot program of selling GFM to contractors are known. Too many years have passed since the GFM problem was made known to DOD and many items of GFM have been improperly requisitioned by contractors during this period. It is apparent that DOD and its components must be kept under constant surveillance on this matter, so that recommended corrective actions are implemented without any further delay.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

The cited GFM test is proceeding slowly. OASD(MRA&L) is continuing to work with the Services to identify a minimum of two maintenance contracts from various systems suchs as aircraft, missiles, electronics, ground support equipment, etc. To date only one contract has been let to test the concept.

DOD 4140.48 Control of Access to DOD Material Inventories by Maintenance Contractors was developed to control the flow of requisitions for GFM from the vendor to the DOD Supply System. This DOD Instruction will be fully implemented by the Services in November 1982. All other affected regulations will be revised as necessary to support this new policy.

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Report of September 23, 1981

DEFENSE INDUSTRIAL PLANT EQUIPMENT

Failure of DOD to have about $290 million worth of industrial plant equipment ready for immediate use can result in additional contract costs and delays in contract performance in case of a national emergency.

In addition to the specific areas of interest expressed by the Committee, the Investigative Staff conducted an inquiry into the management of Defense owned industrial plant equipment (IPE). IPE is that part of DOD-owned plant equipment with an acquisition cost of $1,000 or more; used for the purpose of cutting, abrading, grinding, shaping, forming, joining, testing, measuring, heating, treating, or otherwise altering the physical, electrical or chemical properties of materials, components, or end items entailed in manufacturing, maintenance, supply, processing, assembly, or reserch and development operations.

Section 2 of P.L. 93-155, the Defense Industrial Reserve Act, states, "In enacting this Act, it is the intent of Congress (1) to provide a comprehensive and continuous program for the future safety and for the defense of the United States by providing adequate measures whereby an essential nucleus of Government-owned plants and Industrial Reserve of machine tools and other industrial manufacturing equipment may be assured or immediate use to supply the needs of the armed forces in time of National Emergency or anticipation thereof." (Emphasis added)

The Ailing Defense Industrial Base

The House Committee on Armed Services in its report number 29, dated December 31, 1980, noted there has been a serious decline in the Nation's defense industrial capacity that places our national security in jeopardy. In preparing the reports the Committee panel held 13 days of hearings, including 4 days of field hearings, and took testimony from 34 witnesses. These witnesses included representatives of (1) defense prime contractors and subcontractors, (2) associations, (3) the military, (4) the General Accounting Office (GAO), (5) the Department of Commerce, (6) the Federal Emergency Management Agency (FEMA), (7) DOD, and (8) the Congress. Witness after witness testified before the panel that an erosion of U.S. industrial capability is occurring that, coupled with America's mushrooming dependence on foreign sources for minerals, is endangering our defense posture at its very foundations.

Defense Industrial Plant Equipment

During a visit to the Defense Industrial Plant Equipment Center (DIPEC), Memphis, Tennessee, the Investigative Staff learned that out of approximately 20,000 items of Industrial Plant Equipment in general reserve, which has an acquisition value of about $362 million, only about 20 percent of the items are in known "operable ready" for "immediate use" condition. Senior officials advised the Investigative Staff the reasons the equipment was not ready for immediate use were because (1) funding has not been available

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and (2) Defense Logistics Agency maintenance policy limits maintenance almost totally to items being shipped to users. Efforts to improve the situation were made by DIPEC in March 1980 with a proposed 5-year program to test, inspect, and repair IPE in the general reserve. According to DIPEC officials, the cost of this program would be about $16 million, however, the proposal was not approved by DLA.

D. Investigative Staff Observations

The policy of only providing maintenance to IPE items being shipped to users is inconsistent with the intent of Congress that equipment be ready for immediate use. Failure to have about 16,000 items of industrial plant and equipment items valued at about $290 million ready for immediate use can result in (1) contractors obtaining other equipment and passing these costs to the Government, and (2) delaying contract performance on those contracts where Government owned equipment can be used.

The Investigative Staff believes DOD should comply with the intent of Congress and take necessary action to upgrade IPE equipment in the general reserve to a condition which makes it available for immediate use.

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USE

A summary of this report was included in the FY 1982 Defense Appropriation hearings before the Subcommittee. The Secretary of Defense's response for the record follows.

RESPONSE

Approximately 5,800 units of IPE (not 16,000) in the DOD General Reserve of about 21,000 units require condition verification. This means that the equipment may not be in the precise condition as reflected on the DOD Property Record and a level of effort higher than visual inspection is needed to justify retention or disposal. This is among a number of problems being reviewed. Additionally, DLA is currently reviewing P.L. 93-155 to determine whether a General Reserve is in fact required, and, if so, how big it should be, and what types of equipment should be retained. Until now, the Agency position has been to repair or rebuild only those items for which DIPEC has received a valid requisition. Some of the problems have been: (1) lack of finite mobilization requirements from the Military Services, (2) doubts as to whether the right types of equipment are in the Reserve, (3) deterioration of item components in long term storages necessitating processing through maintenance again, and (4) funding that has not been available for maintenance on items in storage.

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Report of September 23, 1981

AUDITING PROCUREMENT IN THE DEPARTMENT OF DEFENSE

An analysis of more than 200 audit reports showed that the DOD audit agencies have identified and reported on many significant deficiencies involving billions of dollars. The Investigative Staff observed a general weakness by DOD managers to initiate corrective action to eliminate the cited deficiencies, even though in many cases they agreed with them. Although the country is now in the throes of expecting waste, extravagance, and fraud to be routed out by Inspector Generals and their staff who are expected to be meaner than "junkyard dogs," the mere identification of extensive problems will not get the job done. What will be needed, in addition to extensive reexamination of present ineffective procurement practices, is the will by top DOD managers to act on and systematically deal constructively with each deficiency in order to ensure the establishment and operation of a responsive procurement process.

The Defense Audit Service has reported:

-- There are serious technical problems with the PATRIOT missile system that should be resolved prior to proceeding with this $6.9 billion acquisition.

-- The requirements computation for the high-speed antiradiation missile by the Navy and the Air Force may have been overstated by $1 billion, and additionally, there may be a more affordable acquisition strategy than is now being used for the missile's procurement.

-- Planned acquisition of PERSHING II missiles costing about $113 million may not be justified, nor is a $32 million development program to equip this missile system with new radios necessary.

-- The Navy plans to buy PHOENIX missiles in FY's 1980-1984, costing about $790 million, which have serious deficiencies in performance capability.

-- The ROLAND missile system is being acquired at a cost of $2.9 billion even though modifications to the existing CHAPARRAL missiles make it, the CHAPARRAL, more reliable and far less costly at $424 million.

-- About $20 million could be saved by scaling down the construction plans for a High Energy Laser System Test Facility because planned testing at the facility is of limited duration.

-- The Department could reduce its cost (by upwards of $100 million) of future acquisitions of automatic data

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processing equipment (ADPE) by better management of accrued owner equity in ADPE. ADPE acquisitions leased under Defense contracts by 105 Defense contractors had an estimated value of $2.9 billion. These leases were fully or partially paid for by DOD.

-- Planned purchases of tactical aircraft valued at $5.22 billion were not needed based on the criteria established by the Navy and the Air Force.

-- The Department of Defense has more forklifts than is necessary and that a planned procurement of additional forklifts during the 5-year period ending FY 1984 of 1,200 units valued at $411.6 million were unneeded.

-- The Defense Personnel Support Center (DPSC) would save an estimated $7 million annually by substantially increasing the use of Government furnished material; inadequate controls and billing procedures at the center resulted in the failure of certain customers to be charged for about $9.9 million in shipments from procurements for foreign military sales; $14.9 million of Small Business Administration 8(a) contracts at the end of FY 1978 were awarded for which no requirements existed at the time of the buy; and bidders lists maintained at the center cover only 800 of the 2,400 clothing and textile items giving rise to less competition.

-- DPSC lost control of hundreds of millions of dollars of its stock funds, and in an attempt to correct its records, made unsupported financial adjustments of approximately $566 million during FY's 1978 and 1979.

-- Inadequate controls for access to DOD rations in kind were found in the food service program, and some conditions were so bad, referrals to investigatory units were made. The potential loss through fraudulent and wasteful practices could exceed $100 million per year.

The Army Audit Agency has reported:

-- $115 million ($21 million for the Advanced Scout helicopter and $94 million for the OH-58 modernization program) has been spent to develop a scout helicopter, yet the Army is no closer to having a helicopter designed to satisfy the scout mission than it was when development first began in 1974.

-- Army planned to buy TSEC/KY-65's (communications) though the equipment had not been tested to prove its operational readiness, and in addition, the quantity which the Army proposed to buy was in exces of the Army's needs.

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-- The Army paid exorbitant prices for nonstandard items it had previously purchased at much lower prices, because prior cost history for these items was not used when bids were reviewed.

The Air Force Inspector General reported:

-- The Precision Location Strike System (PLSS) should be reviewed with a view towards reductions in development and acquisition costs and to improve survivability and effectiveness of the various PLSS systems.

-- The logistics support and financial management of the multinational program of the F-16 weapon system included projected buy requirements for 80 percent of the peculiar recoverable items that were overstated by $131.7 million for FY 1980 and $22.7 million for FY 1981 due to erroneous computation factors.

The Naval Audit Service reported:

-- The Navy's inventory accounting system, which tracks billions of inventory items, lacks integrity because adjustment transactions in FY 1977 totalling $29.3 billion were recorded, of which $1.1 billion were gross inventory losses. These transactions have grown to $40 billion and $1.4 billion, respectively, in FY 1980.

-- During an 11-quarter period at the Norfolk Naval Supply Center, inventory gross adjustment errors of $52 million were recorded with a resulting $25 million net loss of inventory.

USE

The report was summarized in Part 9 of the Hearings before a subcommittee of the Committee on Appropriations and the Secretary of Defense was asked to respond.

RESPONSE

The Secretary replied that the vast majority of problem areas discussed in the cited audit reports have been the subject of corrective action, either before publication of the reports or after. The Military Departments and Defense Agencies will no longer be allowed to take audit reports lightly. The practice of management concurring in audit findings and recommendations and then not following through with the appropriate corrective action is coming to a halt.

A new DOD Directive 5000.41 has been issued which prescribes policies for the management and follow-up of General Accounting Office and DOD internal audit recommendations. A second DOD Directive, 5000.42, was issued last August to deal with the

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management and follow-up of audit recommendations made by the Defense Contract Audit Agency (DCAA). These two directives have the potential to alter the management style of the Department of Defense dramatically.

Under the new audit resolution and audit follow-up procedures, discipline will be built into the system. First, auditors and managers will be required to reach agreement on each internal audit recommendation, and then concur on a timetable to implement that recommendation. For example, and auditor might recommend the consolidation of two separate maintenance shops at a particular military installation, and claim that such a consolidation could save $100,000 per year. If the commander of that installation agreed with the recommendation, he would have to commit himself to a firm timetable to consolidate the maintenance shops. If he disagreed with the recommendation, the issue would be elevated through the Service's hierarchy until the dispute is resolved. Each Service has identified a senior offical who serves as the ultimate adjudicator of any such disputes.

Deputy Secretary of Defense Frank Carlucci will serve as adjudicator of disputes between Defense Audit Service auditors and managers within OSD, the Joint Chiefs of Staff or the Defense agencies. For the Military Departments the adjudicators will be General John W. Vessey, Jr., the Vice Chief of Staff for the Army, Under Secretary James F. Goodrich for the Navy, and Secretary Verne Orr for the Air Force.

It is important that auditors and managers agree on the final resolution and a timetable for implementing each recommendation because I will expect all "resolved" recommendations to be implemented on schedule. The time to question, resist or balk at an auditor's recommendation is during the resolution phase--not afterwards. Once the disagreement has been ironed out, the follow-up mechanism will move efficiently, and exert continuous pressure to get the changes made.

The concept of follow-up audit recommendations is not new, of course. Major corporations and public accounting firms have been following-up their auditor's recommendations for years to ensure that suggested improvements were actually implemented. What is new in the Department of Defense is the firm requirement that all audit recommendations be "resolved" within six months, that each of the Services develop rigorous follow-up procedures to track the progress of all recommendations, and the commitment of management to ensuring implementation.

A computerized management information system has been established which will monitor the status of all recommendations from every defense-related GAO report, as well as every Defense Audit Services report and Military Department audit agency report. These data bases will distinguish between resolved and unresolved recommendations, indicate which recommendations have

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been implemented, and provide a timetable for resolving and implementing each recommendation.

Even though each of the Services operates its own resolution and follow-up data bases, and is responsible for ensuring that recommendtions are resolved and implemented, the newly created Office of Review and Oversight will oversee their procedures and evaluate their results. This office has been directed to intervene in any cases where it questions the outcome of the resolution and follow-up process. These questionable cases will be brought to the attention of Secretary Weinberger or Deputy Secretary Carlucci.

It is already apparent that the revitalized resolution and follow-up system is altering the work patterns of both internal auditors and managers. Auditors realize that their recommendations are more potent than ever before. Consequently, they are developing their recommendations more thoroughly than in the past. Auditors also recognize the importance of "selling" their recommendations to management while their reports are taking shape so that time-consuming disagreements can be avoided later on.

Similarly, managers are developing a new-found respect for audit reports. Since managers know they will be required to implement whatever changes they agree to, many have become far more interested in the auditor's conclusions on their programs and operations. Managers at senior levels now frequently participate in audit entrance, mid-term and exit conferences. Like the audtiors, they realize it is more logical to discuss findings and recommendations while they are being formulated, than to disagree with them after the audit report has been issued. Similar attention is also being paid to the recommendtions made by contract auditors.

The effect of this invigorated look at contract audit reports is to strengthen the hand of auditors and require contracting officials to pay even closer attention to their money-saving recommendations.

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VI. INDIVIDUAL ISSUES IN REPORT OF OCTOBER 23, 1981

Supplements to the September 23, 1981, report were issued on the B1-B Air Force Long-Range Combat Aircraft, the Army STINGER Missile, and the Navy F/A-18 Aircraft program. Report segments on the first two issues follow. The segment on the F/A-18, which was reported on previously, is included in the appropriate section of the report. Another report on the Air Force VORTAC Class IV B modification, which was sent to the Chairman on October 7, 1981, is included, as part of the segment on Navigational Positioning Systems.

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Report of October 23, 1981

LONG RANGE COMBAT AIRCRAFT (LRCA)

The Investigative Staff reviewed the Joint Air Force/OSD Bomber Alternatives Study and additional detailed data used to support the Secretary of the Air Force's recommendation to procure a variant of the B-1 to meet the requirements for a Long Range Combat Aircraft (LRCA). The Investigative Staff found the full cost of the proposed B-1 LRCA program will be considerably more than the "baseline" cost of $19.7 billion estimated by the Air Force, the aircraft will have less capability than directed by Congress, and the highly concurrent schedule for development and procurement poses significant risks to timely deployment and adequate support of the system. Additionally, the FY 1982 R&D funding request for the B-1 LRCA is overstated by $179 million. A subsequent report on February 19, 1982, shows that despite the fact that the Committee reduced the Air Force's budget request by the $179 million, the Air Force consummated a development contract with full knowledge that adequate FY 1982 appropriation funds were not available to fulfill the terms of the contract.

In addition to the B-1 procurement, the Secretary of the Air Force also recommended a concurrent development program for an Advanced Technology Bomber (ATB). Because of the ATB's uncertainty and highly classified nature, the Investigative Staff did not obtain detailed data on this program.

Scope

The Investigative Staff's findings and conclusions are based on extensive interviews with Air Force, Office of the Secretary of Defense (OSD), and contractor officials as well as detailed documentation provided by these officials. Organizations visited included the Office of the Undersecretary of Defense, Research and Engineering; Office of the Assistant Secretary of Defense, Program Analysis and Evaluation; Defense Intelligence Agency; Assistant Chief of Staff, Studies and Analysis, U.S. Air Force; Deputy Chief of Staff, Operations, Plans and Readiness, U.S. Air Force; Deputy Chief of Staff, Research and Development and Acquisition, U.S. Air Force; Headquarters, Strategic Air Command (SAC); Headquarters, Air Force Systems Command (AFSC); Aeronautical Systems Division and Foreign Technology Division, Air Force Systems Command; and the General Electric Company, Evandale, Ohio.

Background

According to Air Force officials, current U.S. strategic bombers (B-52) are reaching the point of diminishing returns for continued investment in modernization and life extension and are expected to have increasing difficulty in penetrating future improved Soviet defenses.

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The Secretary of Defense in the FY 1981 Department of Defense Authorization Act (Public Law 96-342) was directed to "vigorously pursue full-scale engineering development of a strategic multi-role bomber." The Authorization Act states this bomber should "have the capability of performing the missions of conventional bomber, cruise missile launch platform, and nuclear weapons delivery system," and should achieve Initial Operating Capability (IOC) not later than 1987.

In response to the Congressional directive, the Department of Defense (DOD) conducted a Joint OSD/Air Force Bomber Alternatives Study to identify mission requirements of future bombers and the performance capabilities of potential aircraft. Based on strategic guidance, the study identified five nuclear missions involving penetration, two distinct cruise missile roles (standoff, and launch and penetrate), and a number of conventional missions including support of rapid deployment forces. Candidate aircraft considered in the study were the FB-111B/C, the 1977 B-1, a B-1 derivative, and a "stealth" or ATB.

Based on the results of the bomber alternatives study, the Air Force recommended to the Secretary of Defense the immediate procurement of 100 B-1 derivative aircraft to reach IOC in 1986. In addition, the Air Force recommended a concurrent development effort for an ATB. The Air Force also provided the Secretary of Defense with two alternative programs: procurement of only the B-1 derivative or, procurement of only the ATB. With each of these options, the Air Force also recommended retirement dates for B-52's.

The Bomber Decision

A formal announcement of the bomber decision was made on October 2, 1981, and DOD plans to procure 100 B-1 derivative aircraft to reach IOC by 1986, and to pursue research and development of an ATB which would penetrate improved Soviet defenses beyond 1990. Shortly after the decision, DOD released the bomber alternative study which had been completed in March 1981. The B-1 LRCA program discussed in the study does not reflect changes made to the B-1 LRCA program from March to October of 1981.

The following paragraphs provide a short description of the cost, schedule, performance, and program management of the October 1981 B-1 LRCA program.

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Cost

The Air Force has estimated a baseline program of 100 B-1 LCRA aircraft will cost $19.7 billion in FY 1981 dollars. This estimate does not include over $5 billion spent on the 1977 B-1 program.

The schedule below shows the B-1 LRCA funding levels thought to be required by the Air Force to continue development and to procure 100 aircraft with an IOC date in 1986. The total amount shown, $27.010 billion, is the $19.7 billion baseline escalated to then year dollars.

B-1 LRCA Budget Estimate
(Then Year Dollars in Millions)

	FY81	FY82	FY83	FY84	FY85	FY86	Total
R&D ----------	$ 217	$ 750	$ 750	$ 585	$ 575	$ 58	$ 2935
Production ---	0	1750	3150	4915	6425	6160	22400
Spares -------	0	85	175	175	600	640	1675
Total ----	$ 217	$2585	$4075	$5675	$7600	$6858	$27010

The Air Force estimate is only a baseline figure which includes questionable estimating techniques and excludes substantial costs for current program requirements. In addition, other costs may also be required in the future to provide needed weapons carriage and mission capabilities.

Schedule

The Air Force awarded General Electric Company (G.E.) an initial full-scale development contract for the F101-GE-102 engine in February 1981. Since this engine would be used regardless of which airframe was selected, this early contract award will assist the contractor in meeting an accelerated engine delivery schedule. The Air Force awarded initial full scale development contracts in October 1981 to Rockwell International, Boeing, and Airborne Instrument Laboratories (AIL) for the airframe, offensive avionics, and defensive avionics, respectively. The Air Force is currently negotiating full scale development and production contracts. Aircraft deliveries will begin in early 1985 and IOC (defined for this program as delivery of 15 aircraft to SAC) is planned for 1986. Delivery of 100 aircraft will be completed in 1989. The complete aircraft buy and delivery schedule is shown later in this report.

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Performance

The following table shows various B-1 performance factors.

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Table of B-1 LRCA Design Performance

Sustained speed	
Sea level	.95 Mach
35,000 feet	1.2 Mach
Weight	
Maximum takeoff	470,000 pounds
Maximum flight	477,000 pounds
Fuel capacity	
Internal	195,000 pounds
External	32,930 pounds
Maximum internal payload*	
B-83	24
B-61	24
MK-82	84
MK-84	84

*Although the B-1 may eventually be modified to carry weapons externally, and to carry the Air Launched Cruise Missile (ALCM), it will initially be certified to carry only the SRAM, B-61, B-83, and the MK-82 in its internal weapons bays.

B-1 LRCA offensive avionics will include state-of-the-art technology in its various subsystems. A forward looking radar will be developed to provide high resolution ground mapping and employ a modular concept to allow new modes of operation to be added with minimum modification. Other offensive avionics capabilities include a terrain following radar for low altitude operation, an accurate inertial navigation system, and improved doppler navigation and radar altimeter units.

The defensive avionics include the ALQ-161 to identify and jam threat radars, a tail warning set to detect threat aircraft and missiles, and an automatic flare and chaff dispenser system.

B-1 LRCA survivability will be enhanced by employing several techniques to reduce its radar cross section. Radar absorbent material will be applied to the aircraft's trailing edges, inlet ducts, and antenna shrouds.

Program Management

The B-1 LRCA program is managed by the Strategic Systems Program Office, Wright-Patterson Air Force Base, Ohio. A unique associate contractor arrangement has been agreed to by the four

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major B-1 LRCA contractors, i.e., G.E., Rockwell International, Boeing, and AIL. Under this arrangement, each contractor is directly responsible to the Strategic Systems Program Office which acts as the prime system integrator, but each contractor has agreed to work with the other contractors to resolve integration problems. Air Force officials said that although the Air Force is the system integrator, Rockwell is defined as the lead contractor in the associate contractor agreements and the Air Force will rely heavily on Rockwell to resolve integration problems.

The B-1 LRCA program will enter full-scale development and production without review by the Defense Systems Acquisition Review Council (DSARC). Even though the B-1 LRCA has significant changes from the 1977 B-1, the Air Force does not believe a DSARC is necessary since the 1977 aircraft was approved for production at previous DSARC's. Further, the Air Force believes a decision by the Secretary of Defense to select the B-1 LRCA and authorize concurrent development and production will fulfill the requirements of a DSARC. Apparently the Office of the Secretary of Defense agrees with this approach because a DSARC has not been scheduled.

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B-1 LRCA Cost Estimate

The B-1 LRCA program baseline cost estimate is a rough estimate of the "base sticker price" which does not represent the complete cost of producing, deploying and equipping the aircraft. As a result of Air Force efforts to keep the cost as low as possible, AFSC established a set of "groundrules" to define what elements are included in the "baseline" program. According to these groundrules, a number of production and deployment costs are excluded from the baseline estimate and will have to be funded from non-program sources. Further, because of cost savings efforts that have eliminated certain configuration items and deferred incorporation of others, the baseline aircraft has limited capability.

The Investigative Staff was able to identify a number of program-related items that were not included in the baseline cost estimate. In some cases, the program office was able to provide an estimate of costs for these items, but in other cases, particularly those involving future program costs, they could not provide estimates. While the Investigative Staff has no assurance that the items identified represent all the actions taken by the Air Force, these actions are indicative of the efforts made to reduce the program cost estimate.

B-1 LRCA Baseline Estimate Assumes Cost Reductions That May Not Be Realized

Because of the estimating techniques that were used, the B-1 LRCA cost estimate was given the lowest rating possible (IV-G) under the AFSC system for rating the confidence level in a cost estimate. The $19.7 billion (FY 81 dollars) is based on a series of estimates designed to update 1977 B-1 production cost data for common B-1 LRCA configuration, project the approximate cost of B-1 LRCA airframe modifications and new avionics, and use accepted DOD cost factors, such as 1 percent of total program cost for initial spares, to estimate costs where historic data does not exist. Program officials concurred with the characterization of the $19.7 billion as a "rough" estimate.

The original B-1 variant considered by DOD was defined in a Program Management Directive in December 1980. As the Air Force recommendation was finalized, the program was pared down, principally to reduce the B-1 LRCA cost estimate to below $20 billion. The Investigative Staff identified a number of changes which reduced the estimate over $2 billion and identified other changes for which the program office could not estimate the cost impact.

These items are listed below.

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Change	Cost Reduction (FY 81 dollars in millions)
Deletion of expanded rear bomb bay	$ 175
Deletion of full fuselage fatigue test	140
Waiver of avionics software standards	82
Reduction of engineering change order budget	400
Reduction of the avionics learning curve estimate	100
Reduction of the airframe learning curve estimate	500
Programming a multi-year procurement for production lots III, IV, & V	800
TOTAL	$ 2,197

Although the above actions resulted in a reduction of the B-1 LRCA cost estimate to its current baseline figure of $19.7 billion, there is no assurance these cost savings will be realized. For example, the Air Force and OSD have not made a final decision concerning the first three items. If the rear bomb bay is expanded, and full fatigue tests and compliance with avionics software standards are required, the additional costs shown above would be incurred.

Reduction of the engineering change order budget will reduce the money available for correcting safety and operational problems disclosed during the development program. An Air Force Acquisition Logistics Division official said the limited budget will also preclude changes to improve reliability and maintainability and will, therefore, result in higher operation and maintenance costs when the B-1 LRCA becomes operational. Because the engineering change order budget has been reduced from about $1.1 billion to $700 million, the Air Force may find their estimate is not sufficient to make required safety, operational, or other changes. If this is the case, they will require additional funds for essential engineering changes.

The Investigative Staff believes the final three adjustments to the baseline are basically artificial techniques to reduce the budget estimate. The learning curve estimates for example, have not been negotiated in the contract, and the airframe estimate is based on the transfer of four year old learning experience from the B-1. Similarly, Congress has not authorized the type of multi-year procurement needed to realize the $800 million savings. Multi-year procurement is contemplated only for mature systems that have been in production for some time, but the first B-1 LRCA will not yet be delivered at the time the Air Force plans to negotiate a multiyear production agreement for Lots III, IV, and V.

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The Investigative Staff also identified a number of other changes for which the program office could not provide specific estimates of cost reduction. These include:

-- Deletion of electromagnetic pulse (EMP) testing.
-- Deletion of Fuel Tank Inerting system.
-- Reduction of the initial spares estimate due to a reduction in the annual flight hours estimate.
-- Making provisions to enhance aircraft capabilities in the future rather than providing full capability immediately. These include:

- Forward looking infrared sensor.
- External carriage of weapons.
- External fuel tanks.
- Moveable forward weapon bay bulkhead.

Again, it is uncertain whether these changes will result in actual cost savings. For example, a final decision has not been made by the Air Force and OSD on the first two items, there is some uncertainty about the third item, and the fourth item simply defers part of the cost of providing capabilities that will eventually be needed to provide full B-1 LRCA mission capabilities.

The Cost for Some Current Program Requirements is Excluded From the Baseline Estimate

Major categories of expense which could total several billion dollars and are directly related to B-1 LRCA production and deployment are excluded from the baseline estimate. These costs include items that are being funded from other sources and items whose cost is being "deferred" until later. Those items for which we were able to obtain a cost estimate are:

Cost Category	Cost Estimate (FY 81 dollars in millions)
Development of Air Vehicle Depot Support	$ 200.0
Engine Component Engineering Development (CED)	40.0
Engine Component Improvement Program (CIP) (thru 1987)	115.0
Base Facilities	173.0
Production Facilities Improvement	70.6
Manufacturing Technology Modernization Program	169.7
Simulator Development and Production	337.0
TOTAL	$1,105.3

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Items for which we could not obtain cost estimates are:

-- SAC funding of Nuclear Certification
-- Nonengine Interim Contractor Support
  - Intermediate level (2 years)
  - Depot level (3 years)

Although the Air Force was unable to provide firm estimates for these items, the costs could be substantial. For example, an Air Force official said interim contractor support alone could cost $500 million to $2 billion, depending on the level of support required.

The Investigative Staff recognizes that although "deferral" and delegation of these costs from the program cost estimate baseline of $19.7 billion may be within the discretion of the Air Force program managers, they are nevertheless costs directly related to the B-1 LRCA program and should be included in the total program cost estimate provided to Congress.

The Cost of Providing Full B-1 LRCA Weapon Capability is Not Included in the Baseline Estimate

As discussed later in this report, the B-1 LRCA aircraft will have little or no capability and the cost for eventually providing full weapon capability is not included in the baseline cost estimate. Although a number of existing and developmental weapons other than the basic complement are mentioned as potential B-1 LRCA weapons, they are "growth capabilities" under the current program. The program office has not prepared cost estimates for the avionics and hardware needed to deploy these weapons on the B-1 LRCA. These costs could be substantial.

The B-1 LRCA FY 1982 R&D Funding Request is Overstated by $179.1 Million

In FY 1981, $260.1 million was appropriated for the Air Force to begin research and development (R&D) of the multi-role LRCA. The Office of the Secretary of Defense subsequently conducted a bomber alternatives study, selected a variant of the B-1 to fill the LRCA role, and made plans to award initial full-scale development contracts on June 1, 1981, and full-scale development contracts on September 1, 1981.

Because the formal announcement of the decision to procure the B-1 LRCA was delayed, the Air Force had not awarded the development contracts as of September 30, 1981, and, therefore, had not used all of the FY 1981 appropriations as planned. As of September 30, the $260.1 million had been reduced by $81 million

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which has been obligated for: (1) a B-1 bomber penetration evaluation, (2) initial F101 engine development, and (3) preliminary contractor design work. The balance of unobligated FY 1981 funds as of September 30, 1981, is $179.1 million.

According to a LRCA program office official, the entire B-1 annual R&D funding must be rephased because of the delay in awarding development contracts. This means the unobligated FY 1981 funds will now be used during FY 1982 for the R&D effort originally planned for completion during FY 1981, and some FY 1982 effort will be slipped to FY 1983, FY 1983 effort slipped to FY 1984, etc., through the end of the development period.

Because the B-1 LRCA development contracts have been delayed and the R&D funding has been rephased, the Air Force now has $179.1 million FY 1981 funds in addition to the FY 1982 funds requested to do this work. Therefore, if the entire FY 1982 R&D request is appropriated, the Air Force will have about $179.1 million more appropriations than they planned to obligate during FY 1982.

An Air Force Independent Cost Estimate Will Soon Be Completed

The Air Force is currently conducting an independent cost assessment (ICA) of the B-1 LRCA program. The first stage of this effort involved an assessment of the baseline program. This effort was constrained to estimating only those cost items included in the baseline as defined by the AFSC ground rules. Although the ICA estimate of individual cost elements varied somewhat from the program office estimates, including identification of $375 million for research and development of support equipment that the program office included in the procurement portion of the baseline estimate, the overall ICA estimate was only 3 percent higher than the $19.7 billion baseline estimate.

The second stage of the ICA effort, due to be completed about October 28, 1981, will include the following:

-- Comparison of the $19.7 billion estimate to the initial Rockwell B-1 cost proposal.

-- Comparison of the current B-1 LRCA program to the 1977 B-1 program System Acquisition Report.

-- Identification of cost risks in the current B-1 LRCA program.

-- Cost estimates of program elements not included in the current baseline program, including ALCM, Category D Permissive Action Link/Command Disable System, and compliance with avionics standards.

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B-1 LRCA Mission Capabilities

Although the achievement of the B-1 LRCA IOC is planned for 1986, it will have very limited weapon capability. As a result, certification testing and modification to incorporate additional weapons will be required to meet all the mission requirements that are projected for the B-1 LRCA. Further, the aircraft's future role as a cruise missile carrier may be limited because the DOD has decided not to modify the B-1 rear bomb bay for ALCM carriage.

B-1 LRCA Testing Program is Limited

The baseline B-1 LRCA program provides funds for an absolutely minimum weapons test program which will not be sufficient for full weapon certification of even the limited number of weapons in its basic complement. The baseline program includes testing weapons carriage of only four weapons prior to IOC. These are:

Weapon	Warhead	Delivery Mode
B-83	Nuclear	Gravity drop
B-61	Nuclear	Gravity drop
MK-82	Conventional	Gravity drop

Although OSD has directed the Air Force to incorporate ALCM carriage on the B-1 LRCA, the baseline program does not include the additional cost or the schedule impact of ALCM testing.

Weapon release will be tested for only the optimum delivery locations in the B-1 LRCA flight envelope for each weapon. Further testing to fully certify these and other weapons for the B-1 LRCA will be funded by SAC during their operational testing program and will be done after IOC.

IOC for the B-1 LRCA is defined as the delivery of the 15th aircraft to SAC, and is not related to the capability of the aircraft. According to program officials, the B-1 LRCA cannot be placed on alert until the aircraft receives certification and the first squadron has achieved a suitable readiness rating. Although it is too early to determine how long this will take, program officials said it could be at least a year.

Additional Subsystems May Be Required to Meet SIOP Mission Requirements

Although the B-1 LRCA baseline provides the equipment needed to perform Single Integrated Operational Plan (SIOP) bomber missions as they exist today, it may not be equipped to perform SIOP bomber missions in 1987.

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The B-1 LRCA as currently configured does not have all the equipment SAC believes is needed for these future missions. Further, the baseline LRCA does not include a forward looking infrared (FLIR) sensor which SAC originally stated as a requirement for the damage assessment and strike mission. Air Force officials believe a high quality radar could perform the damage assessment mission as well as identify imprecisely located targets. If cost considerations result in selection of a radar with low capability and low growth potential, however, a FLIR may become necessary or the basic radar may have to be modified or replaced.

Initial B-1 LRCA Deliveries Exclude Cruise Missile Capability and the Proposed Configuration Limits the Aircraft's Future Potential as a Cruise Missile Carrier

Initial B-1 LRCA aircraft delivered to SAC will not be equipped to carry and launch cruise missiles. The decision to procure the B-1 LRCA included direction to incorporate cruise missiles on the aircraft and provided $700 million in additional program funds for this purpose. The Air Force has not decided whether to equip the aircraft for internal carriage only, external carriage only, or both external and internal carriage. Because the baseline LRCA did not include cruise missile capability, however, program officials say cruise missile capability cannot be included in the initial B-1 aircraft within the current delivery schedule. As a result, most, if not all, of the first operational B-1 LRCA wing (15 aircrat) will not be able to carry cruise missiles. According to program officials, the B-1 LRCA will eventually carry 22 cruise missiles (14 externally, 8 internally), but they do not know when this capability will be available on production aircraft.

To reduce costs, however, the Air Force deleted a modification to the rear bomb bay that would have allowed the B-1 LRCA to carrry 16 cruise missiles internally as opposed to only 8 without the modification. This would provide the aircraft the capability to carry a total of 30 missiles (16 internal, 14 external) rather than 22 missiles. The B-1 LRCA program office estimated the rear bomb bay modification would require a one-time expenditure of $315 million--$175 million for design and tooling, and $140 million for full fuselage fatigue testing.

The Air Force anticipates that the Soviets will attempt to defend against cruise missiles by detecting and attacking the carriers before they launch the missiles. External carriage of cruise missiles makes the carrier more detectable by defensive radars, and significantly reduces mission range if the aircraft flies low to avoid detection. To avoid these problems, it may become necessary to carry the cruise missiles internally only. In this case, without the rear bomb bay modification, the B-1 LRCA would be restricted to carrying only 8 cruise missiles internally and twice as many aircraft would be required to deliver a given number of missiles.

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Because the rear bomb bay extension would require major structural changes, Air Force officials stated the cost of retrofitting this modification after production would be prohibitive. In fact, it might prove cheaper to build additional ALCM carriers than to modify those already delivered. Although the Air Force is also considering development of a smaller size cruise missile that could be carried in the current B-1 LRCA bays, this option would cost much more.

Modifications May Be Required for Standoff Conventional Missions

The standoff conventional bombing capability of the B-1 LRCA will depend on future decisions to deploy these weapons and to modify the B-1 LRCA to accommodate them. Because of projected improvements in air defenses, DOD believes standoff conventional weapons will be needed to ensure high survivability in the late 1980's. The current B-1 LRCA configuration does not include the avionics needed for short range standoff weapons such as laser guided weapons or glide bombs.

In addition to making radar, avionics, and carriage provisions for existing weapons, changes may also be necessary to incorporate longer range standoff conventional weapons current being developed.

It is possible that to obtain an effective conventional standoff capability on the B-1 LRCA, aircraft designated for specific conventional missions, such as support of the rapid deployment forces, might have to be modified to the point they can no longer effectively carry out SIOP missions. For example, the B-1 LRCA configuration does not have sufficient growth space to accommodate the equipment and avionics of the proposed Assault Breaker/PAVE MOVER system. If the current B-1 LRCA's must be modified to accommodate such a system for the conventional role, then these aircraft might not be suitable for SIOP missions and more aircraft may have to be produced to maintain an adequate force for the SIOP mission.

Concurrency

Despite the advantage of previous B-1 experience, the high degree of concurrency in the B-1 LRCA program poses a variety of risks to program cost and schedule. The basic procurement elements--engineering development, production, and flight testing--will be conducted simultaneously. The interdependence of these three elements compounds the schedule pressure and risk associated with each item. In addition, the timely development of logistics support for the aircraft will not only be conducted concurrently with these elements, but will be extremely sensitive to program changes that result from them.

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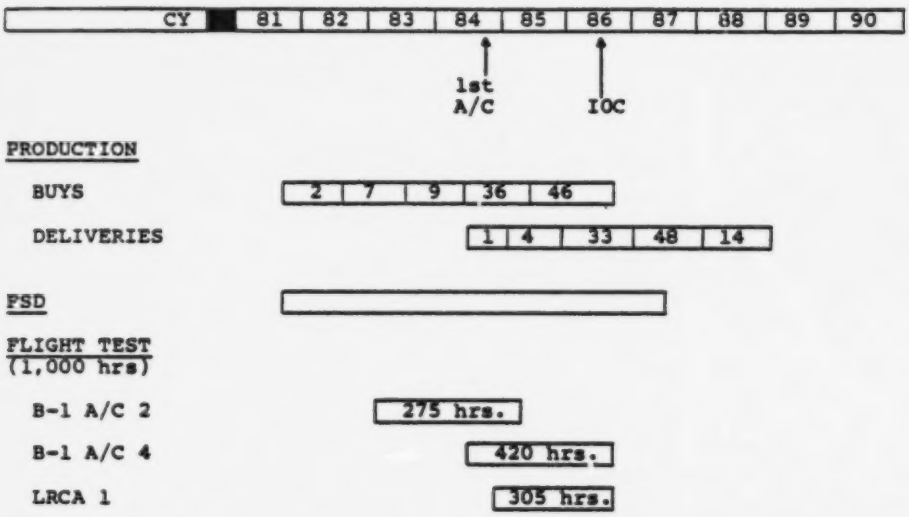
Basic Schedule

The basic B-1 LRCA production and delivery schedule is shown below.



Under this schedule, all aircraft are purchased and 38 are delivered before development, flight, and ground testing are completed. The bomber alternative study discusses a test program extending to mid-1987, by which time 62 aircraft would have been delivered. However, the current B-1 LRCA test program has been compressed to 1,000 hours, terminating at IOC in 1986.

A major problem of the B-1 LRCA full-scale development program will be incorporating the LRCA variations to the original B-1 configuration. Principal among these are structural changes needed to meet the increased weight requirements, forward bomb bay modifications, and the new auxiliary power unit. Incorporating these changes into full-scale development and subsequent production aircraft will require timely completion of engineering work.

The critical issue for B-1 LRCA production is the ability of Rockwell to restart production in 10 months. Much of the manufacturing equipment from the B-1 program can be retained for B-1 LRCA production. The benefits of the experience may be reduced, however, because a major portion of the Rockwell

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effort is being relocated from California to Columbus, Ohio. Other critical factors in meeting the production schedule are incorporation of LRCA modifications, and production and integration of a substantially new avionics suite.

The flight test schedule for B-1 LRCA involves the use of the 1977 B-1 development aircraft numbers 2 and 4, and the first two production aircraft. The old B-1 aircraft, however, will not have the modifications that will be present in the production B-1 LRCA. Current plans call for modifying these aircraft during the test program to enable testing of some LRCA modifications. Even if this is done as scheduled, many configuration changes will not be tested until well into the production effort.

2. Logistics

The Air Force has judged the risk involved in fielding a supportable B-1 LRCA system to be moderate-to-high based on assessment of a number of logistics elements which are necessary to provide an organic support capability. This risk is caused primarily by program concurrency and the early B-1 LRCA IOC. Many of the benefits available from previous B-1 experience are offset by LRCA modifications and the operational requirements of a new strategic bomber.

Program concurrency will delay the stabilization of engineering design for many items and, therefore, delay design and procurement of logistic support items. Such things as spare and repair parts, peculiar support equipment, technical manuals, and training equipment will either be delayed until design is finalized or run the risk of being made obsolete by subsequent design changes. To offset the impact of this concurrency, the Air Force plans to have interim contractor support for airframe intermediate level maintenance for two years after IOC and depot maintenance for three years.

Although the basic B-1 underwent extensive engineering development and test, little was done to develop the logistic support system. Much of the logistic support system on the original B-1 program was consciously deferred to minimize government investment prior to the production decision. Further, program officials told the Investigative Staff the Air Force had little responsibility for B-1 maintenance during the test program, and therefore, only limited information is available for preparation of technical orders and procedures.

3. Future Weapons

Despite the problems created by existing program concurrency, the situation may get worse before it gets better. If SAC feels that capabilities currently listed as "growth capabilities" (for

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example, external weapons or fuel tanks, FLIR, and electronic countermeasures) are needed to make the aircraft SIOP-capable, then these will have to be developed and deployed. If these or other features must be added early in the program, then concurrency and program cost will increase. Similarily, if the conventional B-1 LRCA missions, particularly support of the rapid deployment forces, require additional LRCA capability, these will have to be developed, tested, and certified at the same time.

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ISPOSITION

Based upon findings of the Investigative Staff report of October 23, 1981, concerning the Long Range Combat Aircraft/ B-1 Bomber, the Committee reduced the Air Force budget request by $179,100,000.

An update on the initial examination of the LRCA was reported to the Chairman on February 19, 1982.

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REPROGRAMMING REQUEST

In October 1981, the Investigative Staff report on the LRCA disclosed that the Air Force received $260.1 million in FY 1981 research and development (R&D) funds for a long range combat aircraft. The Air Force FY 1982 budget request for this same purpose was $302 million. These figures were predicated on an anticipated June 1, 1981, Initial Full Scale Development (IFSD) contract award and a September 1, 1981, Full Scale Development (FSD) contract award. However, the IFSD contract was not awarded until October 1981 and the FSD contract was not awarded until January 1982.

Because of this delay in awarding contracts, B-1 program officials advised the Investigative Staff in September 1981, $179 million of the FY 1981 appropriated funds would not be obligated until FY 1982. Since the overall 1982 R&D effort would remain at the same level as initially anticipated, program officials said the entire R&D budget would be rephased. This meant the remaining FY 1981 unobligated funds ($179 million) would be used in FY 1982, some FY 1982 funds would be reprogrammed to FY 1983 and some FY 1983 funds would be reprogrammed to 1984, etc.

Virtually concurrent with the House Appropriations Committee's consideration of the March 1981 amended budget, the Air Force submitted their own amended FY 1982 budget request for $471 million or $169 million more than their initial request of $302 million made in March 1981. The Air Force contends their initial $302 million request was made before contract negotiations had begun and before they had definitive cost information in hand on which to base their request. As contract negotiations progressed, the Air Force recalculated its B-1 funding requirements and determined an additional $169 million would be required in FY 1982. However, the Air Force did not officially submit this request to Congress until October 15, 1981, 2 weeks after the President announced his decision to procure the B-1. The Committee, acting on the information developed from the B-1

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program office, deleted $179 million from the Air Force's amended budget request. When considered in conjunction with the allegedly unobligated funds remaining from FY 1981 (as reported by the B-1 program office), the Committee's deletion of $179 million from the October 15, 1981, amended request left the Air Force with $291.9 million for FY 1982, or only about $10 million less than the $302 million initially requested in March 1981.

The Air Force is now requesting that the $179 million deleted by the Committee be replaced in the R&D account by reprogramming from the FY 1982 procurement appropriation. Air Force officials contend that unless the reprogramming action is approved, they will be required to renegotiate the terms of the full-scale development contract, the B-1 initial operating capability (IOC) will be delayed 6-9 months, and total program costs will increase by $300 million.

There are two matters of major significance which bear directly on this requested reprogramming action.

(A) The Air Force provided about $80 million of the allegedly unobligated FY 1981 funds to the B-1 contractors prior to the President's decision to select the B-1. Of this amount, $30.1 million was used to complete a bomber penetration evaluation with the B-1 aircraft's defensive avionic system, and the remaining $50 million was used to assist the B-1 contractors in preparing for full scale development of the B-1 aircraft. Air Force officials advised the Air Force was committed to meeting a 1986 LRCA IOC and to meet this commitment, they were required to begin some full scale development effort in mid-1981. When the bomber decision was delayed past mid-1981, the Air Force assumed the President would eventually select the B-1 and, based on this assumption, decided to begin providing only the B-1 contractors with funds so they could complete certain tasks that would eventually be required under the full scale development contract. The B-1 program office awarded pre-IFSD fixed price contracts for this purpose.

Although the President did eventually select the B-1 in October 1981, the Air Force--in spite of the public debate taking place concerning its viability, and, in fact, while it was taking place--appears to have pre-selected the B-1 by providing B-1 contractors with these funds prior to an announcement of the President's decision. It also appears that little significant full-scale development effort was obtained from the contractors in return for these funds. Air Force officials attempted to explain the various tasks completed by the contractor during the period prior to the award of the IFSD contracts, but were unable to verify that these tasks did, in fact, reduce the overall full scale development effort.

(B) The Air Force now contends they cannot meet the terms of their full scale development contract with Rockwell unless the $179 million reprogramming action is approved. This means the

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Air Force consummated the contract with full knowledge that adequate FY 1982 appropriations were not available to fulfill the terms of the contract, e.g., consideration of available prior year money and subsequent Committee actions aside, their reprogramming request for $179 million was not made until after the contract was signed, i.e., contract signed on January 20, 1982, and reprogramming request is dated January 28, 1982. The B-1 program office stated they informed appropriate Air Force officials of this fact, but they were ultimately directed to sign the contract. Again, it must be questioned whether the Air Force used proper judgment in this case, and whether they had legal authority to consummate a contract without adequate funds.

B-1 Estimated Logistics Funding Requirements

The B-1 Deputy Program Manager for Logistics was contacted in order to discuss information contained in a recent B-1 program assessment review concerning funding requirements for B-1 logistic support. Total cost projections and a fiscal year breakout for these totals were obtained prior to the discussion with the Deputy Program Manager.

The Deputy Program Manager said the program office had estimated annual logistics funding requirements for the B-1 program as part of the FY 1983 budget process. These estimates had been provided to the Air Force commands responsible for including them in the 1983 budget and the Five Year Defense Plan (FYDP). While the program office was aware of the status of funds for which it had budget responsibility, the Deputy Program Manager contended the B-1 program office did not know if the budget request submitted by other commands contained the same amount requested by the B-1 program office.

As discussed in the Investigative Staff's October 1981 report on the LRCA, the B-1 total program cost estimate of $20.5 billion (FY 1981) does not include a number of cost categories for logistic support. The Deputy Program Manager explained that the $20.5 billion estimate includes only those logistic costs which the Air Force considers investment costs. The estimate does not include operational, maintenance, and training costs necessary to support B-1 deployment. These costs are funded by the responsible commands such as, Air Force Logistics Command (AFLC), Strategic Air Command (SAC), Air Training Command (ATC), and the Propulsion Program Office.

The Deputy Program Manager reviewed the attached fiscal year breakout of B-1 logistics costs and confirmed that they represented an estimate for the logistics elements cited, however, he said that these estimates were constantly being refined and the specific fiscal year breakouts may have already changed.

The Deputy Program Manager said that the $2.905 billion shown as being included in the program estimate was included in the

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FY 1983 B-1 budget request and the FYDP. He said the commands with budget responsibility would have to provide information on the FY 1983 budget and FYDP for those elements; he could not or would not. He said he did not know what program element numbers would be used for the funds not included in the budget.

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Logistics Cost Category	Funding Category	Budget Responsibility	Estimated FY Budget (Millions of FY 1981 Dollars) FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	Total
Items Included in the $20.5B Baseline:											
Development	3600	B-1	9.5	21.2	17.5	17.5	7.3				73
Procurement	3010										
Peculiar Support		B-1		252	754	411	351				1768
Initial Spares		B-1		124	563	269	108				1064
Baseline Subtotal			9.5	397.2	1334.5	697.5	466.3				2905
Items Not Included in the $20.5B Baseline:											
Procurement	3010										
Common Support Equip.		AFLC		13	40	72	40	*			165
Replenishment Spares		AFLC		-	7	132	182	294	*		615
Engine CIP		PRO		4	22	32	31	*			89
Operation & Maintenance	3400										
Interim Contractor Spt.		AFLC		-	4	5	9	48	111	20	197
Depot Equip. Maint.		AFLC		-	-	.2	.5	.9	2.7	*	4.3
Training		ATC		1.4	4	-	-	-			5.4
Military Construction	3300										
Support		B-1		3	112	110	104	-			329
Field Training Detach.		ATC/TAC		-	1	3	2	1	*		7
Non-Baseline Subtotal				21.4	190	354.2	368.5	343.9	113.7	20*	1411.7
GRAND TOTAL			9.5	418.6	1524.5	1051.7	834.8	343.9	113.7	20	4316.7

*Although funds will be required for this item in later years, no estimate of the additional costs is available.

Report of October 23, 1981

STINGER AIR DEFENSE WEAPON SYSTEM

Due to the demonstrated past technical problems and schedules delays in the Passive Optical Seeker Technique (POST) phase of the Stinger Program which will prohibit the award of a production contract for this missile prior to FY 1983, it appears deletion of $31.8 million from the Army's FY 1982 Stinger procurement request would not adversely impact the program.

The Stinger Weapon System is an advanced man-portable shoulder-fired air defense system designed to provide low altitude defense for ground forces against attack by low-flying fixed and rotary wing aircraft. Stinger is to ultimately replace the currently deployed Redeye system. The basic Stinger entered production in FY 1979 and will be produced until FY 1988. Its unit program cost, in escalated dollars through FY 1988, is $66,366.00. It is now in the process of being deployed. The POST version of the Stinger entered engineering development in 1977 and is to provide the Stinger with an advanced seeker to enhance system performance against infrared countermeasures, i.e., flares.

Slippage of the POST Development Program

When the Army initiated engineering development of the POST version of Stinger, a 44-month program was planned. However, technical problems in the areas of hardware fabrication, integration and assembly, and guidance assembly laboratory tests have caused the development program to slip by approximately 20 months. The Army currently estimates that the resulting 64-month development program will not be completed until October 1982 and, consequently, a production contract cannot be awarded until at least November 1982 (FY 1983).

POST Stinger Testing Shortfalls

As of September 1981, POST Stinger had undergone very limited testing. The contractor had flight tested only four of nine missiles, and the Government had not started its portion of the flight test program. Contractor testing is to be completed in February 1982, and the Government will initiate its flight test program in March 1982. If additional technical problems are found during testing, further schedule delays will likely occur.

Reduction of POST Stinger Procurement Quantities

The FY 1982 budget submission by the prior Administration included $132.3 million for procurement of 1,974 Stinger missiles. While not separately identified for the Congress, according to Army internal budget documents, $31.8 million of this amount was earmarked for the procurement of 730 POST Stinger missiles. In

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March 1981, the current Administration submitted its amended budget which increased Stinger funding and the procurement quantity to $227.3 million and 2,544 missiles, respectively. Army documents disclose the amount of funding designated for POST procurement remained constant ($31.8 million), however, the number of POST Stingers to be procured was reduced by 500 to 230. Additional reductions have recently reduced the procurement quantity by another 183 missiles to only 44.

Based on the results of this inquiry, it appears reductions in FY 1982 POST Stinger missile procurement quantities are a function of cost overruns in the basic Stinger Program and the resultant Army anticipation of an internal reprogramming, using POST Stinger procurement funds to defray these overruns, an action which can be accomplished due to the manner in which this program is structured, without prior knowledge or approval of the Congress.

DISPOSITION

Based on this information, the Committee reduced the Army's FY 1982 budget request for STINGER missiles by $31.8 million.

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VII. MEMORANDUM OF DECEMBER 29, 1981

A memorandum dated December 29, 1981, was issued to the Chairman on the Air Combat Maneuvering Instrumentation--the HAMOTS Upgrade System.

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Report of December 29, 1981

AIR COMBAT MANEUVERING INSTRUMENTATION (ACMI)

The Investigative Staff reviewed the proposed procurement for the upgrade of the HAMOTS range instrumentation system at Hill Air Force Base, Utah. The new system is called HAMOTS Upgrade System (HUS).

Serious questions and specific problems concerning the proposed procurement were identified. These problems included:

(1) Only partial use was made of the services of a Joint Program Management Office established to assure interservice compatibility of aircrew combat training systems between the Navy and the Air Force.

(2) The proposed HUS system at Hill Air Force Base was not required to interface with elements of other training systems currently in use, although the Air Force and Navy have entered into a series of agreements which have continuously emphasized interservice compatibility and interoperability of aircrew combat training systems. The training systems are to be capable of supporting Air Force and Navy aircraft equipped with aircraft interface units (pods) compatible with ranges operated by each service.

(3) Questionable cost data was used by the Air Force in making its evaluation.

(4) Questionable technical evaluations were made of the contractors' proposals.

(5) The requirement for the HUS is not as urgent as implied by the Air Force.

Although the Cubic Corporation has fielded ACMI systems, neither Cubic nor General Dynamics has fully demonstrated their proposals for HUS will function as they claim. However, the Air Force has a viable option. General Dynamics is scheduled to field its system in Israel in the spring of 1982, and Cubic at about the same time is scheduled to deliver to the Navy pod and ground installation change kits which should prove the feasibility of simultaneous tracking of 16 high activity aircraft. The Air Force can in effect have a "fly-off" between the two contractors and make its decision based on field performance rather than contractor claims and theoretical engineering evaluations.

USE

The report was used as a basis for questions by the Subcommittee since procurement funding for the HUS was not included in the

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budgeted Range Improvement Equipment program for FY 1982 and previously appropriated funds for the program had expired and the Air Force had proposed to defer previously budgeted items in order to fund the HUS.

The report was also used as a basis for questioning the Air Force Chief of Staff during his appearance before the Subcommittee to discuss the Defense FY 1983 Appropriation request.

RESPONSE

The Department of Defense disagreed with the specific items identified by the report maintaining that the HUS is not an ACMI; they did not circumvent the Joint Program Management Office (JPMO); the statement that the HUS was not acquired to interface with other ACMI's was incorrect; that there is a misunderstanding concerning cost data; and continued to maintain the two contractors were technically equal. DOD also disagreed with the option of delaying the procurement so a comparison of demonstrated capability could be made.

COMMENT

The Air Force comments to the various points in the report offered little of substance to change in any way the overall impression that the Air Force exercised inordinate procurement practices in the acquisition of the HUS. In particular, its position on the following points is untenable: (1) insistence that the HUS procurement is not an ACMI procurement, (2) circumvention of the JPMO in carrying out the procurement, and (3) inadequate comparison of GD's technical potential with technical accomplishments already registered by Cubic.

DISPOSITION

On February 4, 1982, the Air Force awarded a contract for the HUS to General Dynamics.

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VIII. INDIVIDUAL ISSUES IN REPORT OF FEBRUARY 17, 1982

The third major reporting segment on the procurement practices of the Department of Defense as requested in the Committee directive of February 2, 1981, was presented to the Chairman on February 17, 1982, in the form of a Summary and two major volumes. Moreover, in compliance with this directive, the Investigations Staff also submitted summaries, memoranda, and position papers on various topics of concern to the Committee.

The following section of the report contains a presentation of each issue included in the February 17, 1982, report. Responses to these issues have not been offered by DOD.

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Report of February 17, 1982

ARMY/MARINE CORPS ARMORED VEHICLES PROGRAMS

An overview of the armored vehicle programs within the Army and the Marine Corps revealed that requirements are individually developed based on hardware capabilities and service unique perceived needs rather than on integrated doctrine and tactics for a combined arms force.

Armored combat vehicles have been used in the Army and the Marine Corps for many years. Historically, armored vehicles could be functionally categorized as battle tanks, personnel carriers and fire or combat support vehicles. The Army is the largest user of armored vehicles and has acquired an extensive inventory of such vehicles to fulfill these roles on the battlefield. The Marine Corps has generally used the Army's armored vehicles when appropriate and has acquired its own complement of armored vehicles for roles considered unique to the Marine Corps. Although most of the existing inventory of armored vehicles has been in service for many years many of them have been periodically updated, or product improved, to incorporate advanced technology.

Both the Army and Marine Corps are now attempting to modernize their combat forces expeditiously by acquiring large numbers of new mission oriented armored vehicles capable of performing one or more of the traditional armored combat vehicle functions. In addition, both services are in the process of acquiring armored vehicles to function in a newly identified "fighting vehicle" role. To modernize its heavy forces the Army is presently procuring new M1 Abrams main battle tanks, Bradley Fighting Vehicles and several armored fire and combat support vehicles. To meet the demands for a rapidly deployable force capable of contingency operations in many parts of the world, the Army and Marine Corps are simultaneously acquiring an entire family of lighter, more deployable armored vehicles. Procuring the multitude of armored vehicles now planned by the Army and Marine Corps is estimated to cost over $32 billion for the period FY 1982 through FY 1987.

During the review of the Army's Abrams main battle tank (M1) and the Bradley Infantry/Cavalry Fighting Vehicle (M2/M3) programs, (Procurement Practices of the Department of Defense, Volume I, Systems and Programs, September 1981), it was learned that many armored vehicles were being developed at great cost and in apparent duplication and no master plan seemed to exist for the modernization of the armored force. This report therefore is intended to present an overview of the general scope, status and direction(s) of Army and Marine Corps armor vehicle programs.

Unlike the specific M1 and M2/M3 studies, then, this report is not a detailed explanation of individual programs but rather an overview of the complex management process which establishes

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armored vehicle requirements and the variety of armored programs now planned by the Army and Marine Corps. The cost data presented in this report does not represent all program costs, (e.g., logistics, training, spares, etc.) but rather indicates the relative magnitude of overall acquisition costs and comparative armored vehicle costs. Although both the Army and Marine Corps have developed specific tactical requirements to justify the need for the large variety of armored vehicles, some appeared to functionally overlap and a basic comparison of vehicle characteristics, (e.g., weight, speed, etc.) is also presented.

During the course of this review, discussions were held with officials of the Armed Services and the Office of the Secretary of Defense, both in the Washington, D.C. area, and at locations throughout the United States.

Management of Armor Programs

Many Armor Requirement Development Organizations

The Army has an extensive organizational structure to develop plans, concepts, and requirements for its forces.

The U.S. Army Training and Doctrine Command (TRADOC) is charged with the responsibility for establishing doctrine for the U.S. Army and is the "user" representative for the Army community. TRADOC, through the Deputy Chief of Staff for Operations (DCSOPS), informs the Chief of Staff of the needs and desires of the various operational elements of the Army.

To obtain the input of the operational elements, a number of centers (each with an associated school) have been established. Those primarily associated with the requirements for armored vehicles are:

(1) The Armor Center at Fort Knox, Kentucky, the proponent for heavy armored vehicles such as main battle tanks.

(2) The Infantry Center at Fort Benning, Georgia, the proponent for the infantry to include armored vehicles such as armored personnel carriers.

(3) The Artillery Center at Fort Sill, Oklahoma, the proponent for fire support artillery including armored vehicles such as self-propelled howitzers.

(4) The Engineer Center at Fort Belvoir, Virginia, the proponent for some combat support armored vehicles.

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(5) The Air Defense Center at Fort Bliss, Texas, the proponent for air defense armored vehicles.

All of these centers are responsible for the development of doctrine, tactics and the establishment of requirements associated with armored vehicles and their use in Army battalions. They are therefore engaged in the development of concepts, tactics, organizational force design, war gaming and the development of armored vehicle requirements and are organized accordingly.

The Combined Arms Center (CAC) at Fort Leavenworth, Kansas, was established to integrate and consolidate the requirements developed at the various Combat Arms Centers and develop doctrine for a "combined arms force." It is also responsible for the design of the Army organization above battalion level. To accomplish its mission, CAC has a number of organizational directorates to develop concepts, conduct war game modeling, design the organizational force, etc. The plans, requirements and priorities for new weapons systems put forth by the various functional centers are supposed to be consolidated by the Combined Arms Combat Development Activity (CACDA) and forwarded to TRADOC for further consolidation and integration with those from the Logistics Center (e.g., quartermaster, ordnance, etc.) and the Soldier Support Center (e.g. medical).

The Army Deputy Chief of Staff for Operations and Plans (DCSOPS) is responsible for accepting or modifying the TRADOC requirements and priority (shopping) lists. When approved and budgeted, acquisition becomes the responsibility of the Department of Army Readiness Command (DARCOM). For armored vehicles, DARCOM's Tank Automotive Command (TACOM) is the acquisition agent.

Interestingly, in spite of the extent of the organization detailed above, the Army Chief of Staff has also found it necessary to establish several independent organizational entities outside of the formal structure, reporting directly to him, to assist him in managing and planning for the armored forces. Examples are:

(1) Task Forces headed by Generals Kalergis and Wagner to determine tank force requirements.

(2) A Tank Force Management Office to implement Task Force recommendations.

(3) An Army Force modernization evaluation office to coordinate integration of new weapons, including armor, into the forces, (now temporarily reassigned to DCSOPS).

(4) An Armored Combat Vehicle Technology Office Systems Management (ACVT) to assess, test, and evaluate armor technology and prototype vehicles.

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(5) A High Technology Test Bed (HTTB) to determine armor requirements for light infantry divisions.

Visits to TRADOC Headquarters and CACDA revealed that the TRADOC Headquarters staff often deals directly with the centers in tasking studies and analyses and both the CACDA and TRADOC Headquarters staffs conduct studies and analyses themselves. Within the TRADOC community the Investigative Staff found numerous examples of groups engaged in studies, analyses and requirements.

At the time of the Investigative Staff visit in November 1981 the 12 members of the CACDA Concepts Development Directorate who are supposed to be developing broad concepts for Army elements above the battalion were engaged in a crash project called "Hi Lo Mix." This project was established to ascertain what quantities of seven new weapons should be in forces from the basic platoon level through battalion, division and above. Their task was to establish quantity levels only, without addressing shortages or problems. It was admittedly being performed on a judgmental basis by a round table of officers rather than by any formal analytic process.

Visits to the Infantry Center, the Armor Center and the High Technology Test Bed revealed that each of these organizations are also developing plans and requirements for Fighting Vehicles.

Test activities to determine the structure and requirements of a light infantry division are being conducted at the 9th Infantry Division (ID), High Technology Test Bed (HTTB), Fort Lewis, Washington. Because of its charter from the Chief of Staff many Army officials believe the 9th ID has replaced the Infantry School at Fort Benning as the proponent for light infantry armored vehicle requirements. This belief was supported by senior officers at Fort Lewis who speculated that the Chief of Staff established the test bed out of frustration with the TRADOC process and in an effort effort to make an "end run" around the requirements process to speed up the development of concepts and the procurement of equipment.

The Investigative Staff also learned there is a substantial computer capability at TRADOC Systems Analysis Agency (TRASANA) which appears to duplicate many of the computer modeling techniques of CACDA. Although there is reportedly an organizational distinction (e.g., division level gaming at one location and battalion level and below at the other), it was admitted by Army officials that a great deal of duplication exists.

In recognition of the organizational complexities, the Army Chief of Staff has recently directed the Army Inspector General to conduct a management study of the Army's organization.

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Armor Weapon System Acquisition Planning
Driven by Equipment Not Concepts

Discussions with senior Army officers indicate that historically fighting doctrine and tactics have been developed on the basis of new weapons capabilities rather than on doctrinal requirements for an integrated fighting force. Although some of the centers, such as the Armor Center at Fort Knox, develop long-range plans, many of the other centers do not and there has been no TRADOC requirement to do so other than through the budget process.

TRADOC Headquarters at Fort Monroe, Virginia, has recently commenced a major effort to define a battlefield concept for the future. The development of Airland Battle 2000 has been initiated and is being developed to provide an integrated fighting doctrine for the future Army. Senior Army officials at TRADOC conclusively state that all new weapons should be reviewed in the context of an integrated airland battle plan and if not unequivocally justified to fill a vital and defined role within that plan, should not be approved. This planning effort contains a requirement for a series of mission area analyses (MAA's) of the various functional elements (e.g., armor, artillery, etc.) within the Army in conjunction with the doctrine for a combined airland combat force. Unfortunately, these MAA's are in an early state of development.

A number of senior Army officials have admitted that no master plan exists for the modernization of the Army. As a result, most new armored weapons are being developed on a case by case, Ad Hoc basis without due consideration of the effect on a combined force and overall support requirements. With the lack of a master plan and each proponent center developing requirements it is understandable that a variety of armored vehicles are being proposed amidst much confusion and apparent duplication. There is ample evidence to indicate confusion in the Army's armor program. Some examples of the confusion are:

Bradley Fighting Vehicles Systems - This vehicle program is a replacement for several other armor programs which were proposed over a number of years and judged unacceptable due to high cost and unjustified requirements. The new fighting vehicles were reportedly designed to accomplish two functions for the infantry and two for the cavalry. One infantry function is as an armored personnel carrier for the transportation of infantry troops into the battlefield in company with the M1 battle tanks. The other is to provide the infantry with a new armored fighting capability. The Infantry Center at Ft. Benning was, therefore, the proponent command responsible for developing the vehicle requirements for these functions. The cavalry was also reportedly in need of a new armored scout vehicle and the Armor Center at Ft. Knox, Kentucky, was the proponent center responsible for developing the vehicle requirements for this function. The new vehicle will also replace the main battle tank as the cavalry's combat vehicle.

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The Army, in a collegiate effort, consolidated conflicting parochial requirements with the result that the infantry fighting vehicle is only capable of transporting a 9-man infantry squad. This is a substantial deviation from traditional 11-man infantry squad which will require a change in the structure of the infantry organization and potentially require additional vehicles. Although some Army officials contend that this change to a 9-man squad poses no problem and is acceptable, Army officials at CACDA stated that a general officer workshop in 1980 concluded that the 11-man infantry squad should remain the Army infantry standard.

The cavalry fighting vehicle (M3) is considered by some officials in the armor community to be generally unsuitable for its cavalry scouting role because of the limited range of vision from within the vehicle. Design changes to the cavalry fighting vehicle are being discussed as one possibility to correct this deficiency. The replacement of this vehicle by another armored vehicle, the mobile protected gun (MPG), presently being developed is also being considered even though the M3 has not yet been fielded.

Additionally, the recovery vehicles presently designated for these fighting vehicle systems are inadequate and, therefore, must be replaced by heavier duty expensive recovery vehicles.

A further disconnect in the development of the fighting vehicles was the lack of planning for transportability. Although these vehicles are reportedly transportable in C-130 or C-141B aircraft some components (e.g., turret, etc.) must be removed before this can be accomplished.

The Mobile Protected Gun (MPG) - This program is also complicated by having two proponents each with its own interests. The Infantry Center at Fort Benning is the proponent activity which established the requirement for the near term (1985) development of a mobile protected gun system to include a light armored squad carrier (LASC). The Armor Center at Ft. Knox is the proponent activity which is establishing the requirement for the far term (1988) development of a mobile protected gun system.

The MPG system is the Army's version of a light armored vehicle family that was proposed and is being developed by the Marine Corps and is now considered a joint Army/Marine Corps program by direction of the Office of the Secretary of Defense (OSD). It appears that the Army is a late entry into this light armored vehicle requirements program and Army officials admit that very little analysis has been accomplished on this requirement.

The issue of a 9-man versus an 11-man infantry squad is a matter of contention in this program as it was in the fighting vehicle program. Transporting the 9-man squad has been identified as the minimum requirement, however, the ability to carry 11 men has been cited as a "desireable" feature.

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A matter of serious contention within the Army regarding the MPG program is the question of weight. Army officials at the Ft. Knox Armor Center contend that based upon the Armored Combat Vehicle Technology (ACVT) Study, conducted directly under the Army Chief of Staff, a weight of approximately 20 tons is required for optimum efficiency of a light armored vehicle. This, of course, substantially effects transportability. Army officials at CACDA strongly disagree with this position. Army officials at Headquarters TRADOC also disagree and contend that although the ACVT Study was intended to be an objective look at armored combat vehicle technology potentials it was converted by armor proponents into the basis for prototype development of a new fighting vehicle. In other words, it appears that the proponency of the Armor Center influenced the study results.

Main Battle Tanks (MBT's) - The design, development and acquisition difficulties associated with the new M1 Abrams tank have been discussed at length in a number of forums. In spite of this, M1 Abrams tanks are currently being produced and hastily fielded even though inadequacies still exist regarding their tactical utilization in a combat maneuver force. These inadequacies and associated "fixes" are:

(1) Because of the weight of this vehicle new heavier equipment transports are required as well as modified recovery vehicles and both are now being programmed.

(2) Due to the M1's increased fuel consumption, unique maintenance system, etc., there is a critical shortage of fuel trucks, ammunition resupply vehicles and other associated support vehicles and many of these are now being included in the budget process.

(3) There is a difference in the mobility (cross country and road speed) capabilities of the M1 and existing combat service support vehicles. This has resulted in an established need for several new vehicles. While these vehicles are now in various development stages they will not be available until the late 1980's or early 1990's.

(4) In a combined arms force environment there is presently a difference in mobility and agility capabilities between the M1 and other combat vehicles such as air defense vehicles (DIVAD), antitank weaponry such as the improved TOW vehicle (ITV) and the M113 armored personnel carrier. This difference will essentially force M1 maneuver units to reduce their speed to that of the slowest support vehicle. Several tactical scenarios have been fabricated, presumedly to diminish this problem but one question obviously remains: What increase in overall effectiveness has been provided to the combat maneuver force by the early and unbalanced fielding of the M1 tank?

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Army officials have expressed concern about the Army's general logistics capability and inadequacies in the number and types of combat support vehicles needed to supply ammunition and fuel to the new tanks and armored fighting vehicles with their high rates of consumption. The need for combat support, however, is not a newly discovered need but rather one of long standing which should be an integral link in the chain of weapon acquisition process. They acknowledged that the Army must satisfy an immediate and obvious need for combat support vehicles due to past concentration on new weapons and inattention to support requirements. As a result the total cost of new armored weapons is often misunderstood because directly related combat support requirements such as rearm, refuel, and maintenance vehicles are not presently included in new weapon program costs. Army officials have acknowledged that new armored combat support vehicles are essential in order to realize the full benefit of new weapon vehicles. The Army is now faced with attempting to correct the imbalance between new armored combat vehicles and new armored combat support vehicles in a constricted time frame, in an inflated economy and within DOD budgets already buffeted by ever increasing demands.

The Investigative Staff could find no significant evidence that an objective analysis of existing capabilities was accomplished in an attempt to improve light armored vehicle capabilities. When the requirement for the LASC version of the mobile protected gun was proposed, TRADOC Headquarters personnel recommended modification of the existing M113 armored personnel carrier to perform this function. Even though funds were provided in previous years to design and test a modification of the M113 to improve its speed and agility, for comparability to the M1, no consideration was apparently given to this alternative concept which potentially could have provided an increased capability sooner and at less cost. Instead, immediate efforts began for the acquisition of a "new vehicle." Army officials at CACDA acknowledge that a study concerning the feasibility of adapting the M113 armored personnel carrier to meet the near term term light armored squad carrier requirement is rational and will probably be done after tests of new vehicles are completed. Curiously, although the 1983 Budget includes monies to procure 520 new M113s and product improve older M113s, they will not have the latest speed upgrade described above.

A primary requirement for the Army's far term mobile protected gun (MPG), scheduled to be fielded in the 1988-1990 time frame, is transportability by C-130 and C-141B aircraft. In response to questions concerning why 1960 vintage aircraft were being used as the basis for transportability analysis Army officials stated that discussions with the Air Force did not reveal that any other aircraft types would be available. Army officials acknowledged that no formal requirement has been given to the Air Force for the modification of existing aircraft or the development of transport aircraft suitable for transporting the fighting

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vehicle systems (M2/M3), even though these vehicles would admittedly meet the other objectives of the mobile protected gun program and eliminate the need for the new MPG vehicle.

The 9th ID, HTTB has been authorized to conduct tests and acquire light armored vehicles for the purpose of determining tactics, doctrine and light armored vehicle requirements. Personnel at CACDA have only recently established a working relationship with 9th ID personnel and have suggested that the primary task of the 9th ID should be to determine the mission, structure, tactics and doctrine of a light division and thereafter establish vehicle requirements consistent with that role rather than allow hardware capabilities to be the driving force in defining the light division. While professing to maintain close liaison with the TRADOC centers officials of the 9th ID High Technology Test Bed (HTTB) acknowledged they have a free hand to develop new concepts, doctrine and tactics and are not bound by work going on or completed elsewhere. In fact, the HTTB has written draft Required Operational Capability (ROC's) documents for several new combat vehicles. Although these documents have not yet been approved their existence raises questions about the future utility of several vehicles currently in the early stages of procurement; specifically, requirements for a lighter mobile protected gun, a Light Armored Personnel Carrier about one-quarter of the weight of the current vehicles being tested, and a much lighter Multiple Launch Rocket System have been identified. Although some of the actual work being done at the test bed regarding very light transportable vehicles is interesting, the test bed is approximately 50 percent staffed, and their work is obviously not consistent with other Army efforts for light armored vehicles.

Although tasked with conducting computer analyses for a combined arms force the Investigative Staff learned that the computer analysis capabilities at CACDA are extremely limited. The Army computer models are reportedly unable to do a comparative analysis concerning the relative merits of various numbers of artillery, armor, air support, etc., in a combined arms force. For example, present programs cannot accurately assess the effect of man portable antitank missiles in a close combat scenario. These models also lack capability to effectively assess command and control communications during their simulated war games and CACDA officials have only recently been directed to consider the effects of chemical and nuclear activity in a conflict. These models also assume an unlimited supply source and therefore do not address the reality of sustaining a maneuver force. In recognition of the extreme shortcomings in the Army's war gaming capabilities a major effort has been undertaken by CACDA personnel to improve the capability of war gaming efforts in an attempt to create a more realistic environment and a number of the analytical personnel at CACDA have been diverted to this project.

Army officials acknowledge that at the present time the Army does not know the mechanization requirements for light infantry

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divisions. They are presently conducting a number of studies on the effects of armored vehicles and various weapons systems such as:

(1) A study to determine the extent to which a light division should be motorized.

(2) A mortar study to determine the quantity and requirements for mortars.

(3) An air defense study to determine air defense requirements.

(4) A study to determine the quantity of multiple launch rockets systems (MLRS) required. (The Investigative Staff was told the current requirement for one MLRS system per division was directed by the Army Chief of Staff.)

(5) New "test beds" to evaluate future close combat vehicles (two), and test beds for a division support weapons system and armored resupply vehicles.

(6) The previously described HTTB at the 9th ID whose current planning provides for a 100 percent motorization requirement as well as nearly 100 percent air mobility by BLACKHAWK helicopter.

In spite of all this uncertainty and the realization that it does not know what types or quantities of equipment are actually required the Army continues to design, develop and procure a vast number of armored vehicles.

The Army's Decision Process

As a result of organizational complexities, the need to allow each proponent to present his position, rebut everyone else and then defend his position, as well as the inability of the studies and analysis groups to provide enough information, the Army's decision making process is apparently very slow.

Examples of the Army's inability to make decisions in a timely fashion are:

The decision to remove M60-A2 tanks from Army inventory because of their complexity and difficult sustainability was made by the Army Chief of Staff nearly 2 years ago. At the present time approximately 540 M60A2 tanks are parked at the Anniston Army Depot in Alabama. Army officials at the Armor Center in Fort Knox and at TRADOC Headquarters acknowledge that over the last year and a half they have submitted a number of alternative uses for these vehicles to the Army Staff. In spite of this, officials

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of the Army staff acknowledge that as of January 30, 1982, no decision has been made concerning their use.

Most of the M551 Sheridan tanks have likewise been withdrawn from the Army inventory. Some remain in use for the Army's Airborne Division, however, approximately 1,100 have been put into temporary storage. Here again no decision has been made to date for any alternate use of these vehicles even though the automotive component is acknowledged to be excellent. The claimed shortage of armored vehicles for engineer, bridge launch, mine clearing and air defense when juxtaposed with the Army's continuing inability to decide what to do with the M60-A2 and M551 assets appears to be an indictment of Army decision making processes.

Although Army officials contend that M60 battle tanks are inadequate against "the threat", they admittedly will be in the inventory through the year 2000. In spite of this and aside from programs to convert earlier M60-A1 versions to M60-A3 versions with associated improvements in fire control, no program currently exists to improve the speed and agility of these tanks. A manufacturer of tank components has proposed a modification to improve the capability of the M60 tanks for some time and Chrysler Corporation, the manufacturer of these tanks, is also proposing a similar improvement program. Although Army officials state they have reviewed a proposal for a "Super 60" tank and found it wanting, there is some doubt that these proposals have been given serious attention. Many Army officials have stated that the Army will not do anything in the main battle tank area at present because of the potential impact on the M1 and fighting vehicle programs. The implication, of course, is that once these programs are fully stabilized a future requirement to improve the M60 fleet will be developed.

Marine Corps Armor Requirements Questionable

The Marine Corps, because of its smaller size, has a simpler organization structure involved in modernizing its ground combat forces. As a result the Marines seem to have avoided many of the problems associated with the Army's proponent system. Within the Marine Corps all work done on both new equipment and the concepts regarding their employment is done under the auspices of the Marine Corps Development and Education Command (MCDEC) at Quantico, Virginia. Decisions regarding the acquisition of new vehicles are made at Headquarters Marine Corps. Most Army armored vehicles are also used by the Marines so the Army's Tank Automotive Command (TACOM) acts as the acquisition agent for the Marine Corps. In the case of armored vehicles unique to the Marines (amphibious tractors) the acquisition agent is the Naval Sea Systems Command (NAVSEA).

In a departure from its traditional emphasis on "light foot infantry", the Marine Corps is in the process of acquiring a number of new armored vehicles which will afford new capabilities

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in terms of firepower and mobility. A number of the individual requirements for some of these new light armored vehicles appear questionable.

One of the prime requirements for the LAV Program is that the vehicle be transportable by CH-53E helicopter. To ensure this a maximum weight requirement of 14.5 tons was established. This weight limit is the reported upper limit of the CH-53's lift capacity under ideal conditions. In less than ideal conditions the lift capability is significantly reduced. Additionally, the planned acquisition of only a limited number of CH-53E helicopters in the future does not appear to reflect a true commitment to the concept of helicopter transportability of these vehicles. Senior Marine Corps officials have stated the helicopter lift requirement was being pushed by the Marine Corps as their only means of forcing the Army to keep the vehicle light and that the actual ability to move the LAV's by helicopter was not critical.

The speed requirement for the LAV combat vehicles is also questionable. The high road speed (50 mph) and the lack of a cross country speed requirement is unusual and essentially eliminates the M113 family of vehicles from consideration. Many of the M113 family variants are currently in the Army's inventory and all but one of the variants proposed in the new LAV program have been produced as M113 variants and sold to foreign armies. Previous Army tests have indicated that the M113 family is capable of a road speed of 46 mph (4 miles per hour less than the LAV requirement) and these vehicles meet the weight requirement. Since these vehicles are currently being produced, the training package is substantially complete and the integrated logistic support (ILS) package is already largely in place.

The current position of the Marine Corps and the Army is that the M113 does not conform to the Required Operational Capability (ROC) of the LAV/MPG-N, however, the evaluation of the M113 should have taken place prior to the development of the ROC. DOD Directive 5000.1 (Major System Acquisitions) requires the consideration of both the use of existing military or commercial systems and modification or product improvement of existing systems before development of a new system is undertaken. The M113 family of vehicles appears to be capable of fulfilling the basic mission needs which spawned the LAV program. If this is the case, these requirements could be addressed more rapidly, with less cost and at a lower risk than the current LAV/MPG program provides.

The Marine Corps is developing another new family of amphibious armored combat vehicles, the LVT-X. These vehicles which are reportedly being 10 percent designed to perform an amphibious assault role and 90 percent to perform a land combat role, will also have a personnel carrier/fighting vehicle variant, a recovery variant and a command and control variant. Based on the current cost of the LVT-7 and the fighting vehicle systems it appears that the unit program cost of the LVT-X will be in the $2 million range making the total program cost well over $2.6 billion.

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The requirement for this LVT-X vehicle is questionable because of a alleged operational conflict between the Navy and Marine Corps. The Marine Corps position is that LVT type vehicles are necessary in order to provide a continuing amphibious assault capability in the 1990's. Since these type vehicles have a water speed of only about 8 to 10 miles per hour Navy amphibious ships must come within 3,000 to 5,000 meters of the beach to launch them. The Navy states that this operational concept exposes the ships to direct fire from a multitude of new and effective missile weaponry. As a result the Navy is planning to launch Marine forces from further out to sea and will achieve this capability by procuring 107 Landing Craft Air Cushion (LCAC) by 1992 at a program cost of over $2.2 billion.

The LCAC program was also described as necessary for amphibious assaults. It was originally justified in large part, because of the LCAC speed (over 50 mph) and range which allows the craft to be launched from "over the horizon" (20-45 miles out). Although the Navy has reportedly agreed for the time being to launch LVT's near the shore there apparently remains a serious controversy over future assault operations and how close to the beach the Navy will go. Navy officials have stated that both systems will be developed and a decision rendered in the 1990 time frame after future assessment of LCAC capabilities. It would seem rational to resolve this issue before incurring considerable expenditures for both programs.

Interservice Cooperation

Despite hearing a great deal about Interservice cooperation, there is no evidence of real, effective cooperation between the services in the development of new weapons and support systems.

The LAV/MPGN program, an OSD mandated joint program between the Army and the Marine Corps has resulted in only one point of agreement--that both need a new family of armored vehicles lighter than the Fighting Vehicle System family. The apparent effect of the OSD mandate was to impose Marquis of Queensberry rules on the fight. Although "joint" testing is in progress, once the source selection is made by a Marine Corps/Army selection board, the Army is planning to have the selected test vehicles reconfigured into the Army versions and retested at an Army site to determine if the vehicles actually meet the Army's operational needs. Although the Marine Corps considers the LAV program to be "low risk," the Chief of the DCSOPS Requirements Directorate considers the Army versions of the LAV "high risk" because the integrated Army variants are not being tested prior to the source selection.

LAV's are currently being tested in a joint Marine Corps/ Army program at 29 Palms, California, for the purpose of selecting a vehicle type for Marine Corps and Army use. At the same time, the 9th ID (HTTB) at Ft. Lewis, Washington, is experimenting with light armored vehicles, (including one slightly different vehicle from the same manufacturer as one of the vehicles at 29

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Palms), for the purpose of developing new requirements for light armored vehicles. There is no evidence of significant coordination between these efforts and senior officials at both locations have acknowledged this situation.

The Air Force also has a reported requirement for 1,200 armored vehicles for Forward Air Control (FAC) and 1,800 vehicles for air defense. Tactical Air Command liaison officers stated that it is the Air Force's intention to use the same vehicle the Army selects for its Fire Support Teams (FIST) and had so informed the Army, but they were unaware of the Army's intention to purchase the FISTV, a modified M113. These officers also advised that the Air Force had developed a pod containing all of the FAC equipment which will fit in an M113. The Air Force is also independently planning to conduct tests of yet another air defense vehicle which is also a modified M113 vehicle.

The principal reason given for the hasty acquisition of vehicles and the future LAV/MPGN Program is to have vehicles in the force which are more readily deployable both strategically and tactically. In view of this urgent need for a strategically deployable vehicle family the ability of the Navy and the Air Force to transport and deploy these ground combat forces was questioned. The answers which were received raise serious questions as to the entire modernization program of the Department of Defense.

In both the Army and the Marine Corps most of the new armored vehicles are going to units which currently have no vehicles. While this will probably increase the firepower and potential mobility of these units it will obviously impact adversly on the deployability of these units. As a previous Investigative Staff report noted (Procurement Practices of the Department of Defense, Volume 1, Part 1, September 1981), the ability of the Air Force and Navy to transport the Rapid Deployment Force (RDF) is extremely limited. Senior Army and Marine Corps officals acknowledge that strategic transport capabilities are a serious problem. A senior Marine Corps officer stated that currently all of the Navy's available amphibious ships would have to be assembled in order to move just one Marine Amphibious Force.

Providing new armored vehicles to units which currently have no vehicles increases their strategic transportability requirements and any increase in transport needs obviously further strains the already overburdened strategic transport system. New lighter armored vehicles will undoubtedly improve the utilization of airlift and sealift assets but the acquisition of new vehicles in quantities which may leap far ahead of a concurrent increase in airlift and sealift capability seems a questionable use of limited resources.

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Army/Marine Corps Armor Program Costs

Fielding the broad range of new armored combat vehicles being planned by the Army and Marine Corps will be a financially intensive effort. A review of acquisition costs alone for major armored vehicles indicates a significant cost growth over the next several years for programs currently in the acquisition phase. As other programs now in early development emerge, similar cost growths can reasonably be expected which will significantly impact the DOD budget. Senior defense officials acknowledge concern over the future availability of money to acquire all these new armored vehicles in the quantities planned for the mid-1980's and beyond. Concomitant with the concern about acquisition costs is the question of life cycle costs. The costs of such items as personnel, facilities, training and the logistics associated with the introduction of these new armored vehicles will become increasingly more burdensome as the inventory increases.

Table 1 following, indicates the magnitude of the cost for the major armor programs currently in acquisition or planning stages. The figures shown in this table should not be considered all inclusive or final as data for some of the costs normally associated with a program, (e.g., integrated logistics, initial spares, training, etc.) could not always be specifically provided. These figures, though admittedly not final or precise, are the latest and best available from early FY 1983 budget documents, program manager cost data, and program planning estimates and do provide a composite overview of the acquisition cost burden the Government will assume should these programs go forward as programmed and planned by the Army and Marine Corps.

The table reflects the identifiable costs for armored combat vehicles currently being acquired and planned as well as the programmed and planned costs for major product improvement programs (PIP's) to the existing Army/Marine Corps armor fleet such as conversion of Army M60A1 tanks to the M60A3 model and the Marine Corps landing vehicle Service Life Extension Program (SLEP). Other major PIP's such as those for M109 and M119 howitzers are also indicated.

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TABLE 1

OVERVIEW OF ARMY/MARINE CORPS ARMOR PROGRAM COSTS

Vehicles	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987	6-Year Total
			($ in Millions)				
New Buys of Vehicles Already in Inventory:							
M113	-	$ 92	-	-	-	-	$ 92
M109	$ 21	-	-	-	-	-	21
M125	7	-	-	-	$ 88	-	95
M88	125	156	$ 178	$ 189	36	-	684
M577	4	24	-	-	-	-	28
LVT-7 (MC)	57	152	164	39	-	-	412
Subtotal	$ 214	$ 424	$ 342	$ 228	$ 124	-	$ 1,332
New Vehicles in Production:							
M2, M3	$1,127	$1,126	$1,289	$1,532	$1,769	$1,515	$ 8,358
M1 & M1E1	1,577	1,889	2,383	2,491	2,775	2,406	13,521
MLRS	124	133	138	80	54	-	529
FAASV	4	50	142	152	153	21	522
M9	40	-	-	-	-	-	40
Subtotal	$2,872	$3,198	$3,952	$4,255	$4,751	$3,942	$22,970
New Vehicles Planned (funding profile est.):							
MPG-N	-	$ 52	$ 124	$ 102	$ 112	$ 117	$ 507
LASC	-	52	87	118	120	123	500
LARV (LAV(R)-Army)	-	8	14	16	20	17	75
LAV (all MC variants)	$ 41	90	81	85	124	130	551
MPGS (RDT&E only)	-	65	111	59	226	133	594
AFARV	-	-	-	-	43	248	291
Subtotal	$ 41	$ 267	$ 417	$ 380	$ 645	$ 768	$ 2,518
New Vehicles by Modification of Existing Vehicles:							
M901	$ 22	$ 82	-	-	-	-	$ 104
DIVAD	339	595	$ 634	$ 540	$ 413	$ 224	2,745
FISTV	-	62	188	136	-	-	386
Subtotal	$ 361	$ 739	$ 822	$ 676	$ 413	$ 224	$ 3,235
Product Improvements:							
M60A3 PIP	$ 155	$ 159	$ 175	$ 185	$ 195	$ 204	$ 1,073
LVT-7 SLEP	176	157	176	-	-	-	509
Other Major PIP's	27	68	61	88	112	117	473
Subtotal	$ 358	$ 384	$ 412	$ 273	$ 307	$ 321	$ 2,055
GRAND TOTAL	$3,846	$5,012	$5,945	$5,812	$6,240	$5,255	$32,110

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Armored Vehicle Review

Identification of Armored Vehicles

Because of the large costs associated with the acquisition of these new vehicles, life cycle maintenance costs and the resultant overall affordability question, a general review and comparison of armored vehicles was conducted. The objective was to:

(1) Identify most of the major armored vehicles now being used by the Army and the Marine Corps.

(2) Identify the major new armored vehicles currently being acquired or being planned by the Army and the Marine Corps.

(3) Compare the key characteristics of existing and new vehicles within functional categories.

(4) Obtain information regarding the armored vehicle programs within each functional category.

The following two tables list the major armored vehicles currently in service in the Army and Marine Corps and new armored vehicles in production or being developed.

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TABLE 2

ARMORED VEHICLES IN SERVICE
AS OF DECEMBER 31, 1981

Function	Description	Designation	Service
Personnel Carriers:	Armored Personnel Carrier	M113	Army
	Landing Vehicle Tracked Personnel	LVTP-7	Marine
Battle Tank:	Sheridan Tank	M551	Army
	Main Battle Tank	M48	Army
	Main Battle Tank	M60	Army/Marine
Fire Support:	Mortar Carrier (81mm)	M125	Army
	Mortar Carrier (4.2in)	M106	Army
	Self-propelled Howitzer (155mm)	M109	Army/Marine
	Self-propelled Howitzer (8in)	M110	Army
	Vulcan Gun Carrier	M741	Army
	LANCE Missile Carrier	M667	Army
	Improved TOW Vehicle	M901	Army
	CHAPPARAL Missile Carrier	M730	Army
Combat Support:	Recovery Vehicle	M578	Army/Marine
	Recovery Vehicle	M88	Army/Marine
	Cargo Carrier	M548	Army
	Command Post Vehicle	M577	Army
	Combat Engineer Vehicle	M728	Army
	Armored Vehicle Launch Bridge	M60AVLB	Army
	Armored Vehicle Launch Bridge	M48AVLB	Army
	Landing Vehicle Tracked Command	LVTC-7	Marine
	Landing Vehicle Tracked Recovery	LVTR-7	Marine

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TABLE 3

NEW ARMORED VEHICLES IN PRODUCTION OR BEING DEVELOPED
AS OF DECEMBER 31, 1981

Function	Description	Designation	Service
Personnel Carriers:	Light Armored Squad Carrier	LASC	Army
Fighting Vehicles:	Bradley Infantry Fighting Vehicle*	M2(IFV)	Army
	Bradley Cavalry Fighting Vehicle*	M3(CFV)	Army
	Mobile Protected Gun (Near Term)	MPG-N	Army
	Mobile Protected Gun System	MPGS	Army/Marine
	Light Armored Vehicle (Light Assault)*	LAV(LA)	Marine
	Landing Vehicle Tracked Personnel*	LVT-X(P)	Marine
Battle Tank:	Abrams Main Battle Tank	M1	Army
Fire Support:	ROLAND Missile Carrier[1]	XM975	Army
	Multiple Launch Rocket System	MLRS	Army
	Division Air Defense Gun Vehicle	DIVAD	Army
	Light Armored Vehicle (Mortar)	LAV(M)	Marine
	Light Armored Vehicle (Assault Gun)	LAV(AG)	Marine
	Light Armored Vehicle (Anti-Tank)	LAV(AT)	Marine
	Light Armored Vehicle (Air Defense)	LAV(AD)	Marine
Combat Support:	Fire Integration Support Team Veh.	FISTV	Army
	Field Artillery Armored Supply Veh.	FAASV	Army
	Armored Combat Earthmover	M9(ACE)	Army
	Armored Forward Area Rearm Veh.	AFARV	Army
	Armored Refueler Vehicle	ARV	Army
	Maintenance Assist Vehicle	MAV	Army
	Medical Evacuation Vehicle	MEV	Army
	Light Armored Recovery Vehicle/ Light Armored Vehicle (Recovery)[2]	LARV/LAV(R)	Army/Marine
	Light Armored Vehicle (Logistics)	LAV(L)	Marine
	Light Armored Vehicle (Command)	LAV(C)	Marine
	Landing Vehicle Tracked Recovery	LVT-X(R)	Marine
	Landing Vehicle Tracked Command	LVT-X(C)	Marine
	Landing Vehicle Tracked Engineer	LVT-X(E)	Marine

* Multifunction vehicle, only one function shown.
1 Contract for armored vehicle recently discontinued.
2 Army and Marine Corps designations differ for this vehicle.

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Although the Army and Marine Corps have developed different operational requirements for their respective vehicles and some of the new vehicles reportedly have multiple operational roles, both new and existing vehicles were categorized as performing one or more of the five general combat functions: personnel carrier, fighting vehicle, fire support, combat support, and tank. When an armored vehicle was reported to have multiple roles it was considered in each of its functional categories. Several caveats apply to the unit costs cited in the five tables appearing in this comparative analysis section. First, program unit costs are generally based on 1980 or later dollars or on FY 1983 budget estimates; second, in some cases the unit program costs are not final or precise because all of the program costs (e.g., all R&D, initial spares, etc.), were not provided. The unit cost figures in these tables are useful, however, because they do provide a relative comparison of cost differences between vehicles within the same functional category. The results of this review are as follows:

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TABLE 4

PERSONNEL CARRIERS

Description	Design ation/ Acronym	Service	Status	Troop Capa- city	Weight (tons)	Main Gun	Machine Gun	Can Swim	Armor[1] Protect. Level	Speed Road/CC (mph)	Unit[2] Pgm Cost Est. ($000)
Arm Pers Carrier	M113	Army	In Serv	12	13	—	.50 cal	Yes	7.62mm	40/19	$ 152
Lndg Veh Trkd Pers	LVTP-7	Marines	In Serv	28	26	—	.50 cal	AMPHIB	7.62mm	45/31	1,330[3]
Inf Fighting Veh*	M2	Army	Prod	9	25	25mm	7.62 mm	Yes	14.5mm	41/31	1,800
Lt Arm Sqd Carrier	LASC	Army	Dev	9-11	14.5	—	.50 cal	Yes	7.62mm	50/?[5]	438
Lt Arm Veh Lt Aslt*	LAV-LA	Marines	Dev	9	14.5	25mm	—	Yes	7.62mm	50/?[5]	799[3]
Lndg Veh Trkd Pers*	LVT-X(P)	Marines	Dev	20-28	?[6]	25mm	—	AMPHIB	7.62mm	45/31	1,800[4]

* Multifunction vehicle.

1. Armor column numbers denote general calibre range of ammunition vehicle is protected against.
2. Unit cost estimates are 1980 or later dollars or 1983 budget estimates and are generally unit program costs. In some cases, all program costs, e.g., research and development, initial spares, etc., were not readily discernable.
3. Unit program cost is based on total buy of all variants, costs of specific variants will differ.
4. Investigative Staff estimate based on current costs of LVT-7 and M2/M3 and contractor discussions.
5. No cross country speed requirement specified in LAV program.
6. Weight not currently known.

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Observations

Although the Army and Marine Corps identify different operational requirements thereby justifying the need for different types of vehicles to carry personnel the stated needs and justifications appear questionable.

It appears that if the basic function of an armored personnel carrier is to transport troops with some armor protection it can be done relatively inexpensively in most cases as evidenced by the cost and capabilities of the M113 personnel carrier.

There appears to be little difference between the basic performance characteristics of vehicles such as the existing M113 Armored Personnel Carrier and the new Light Armored Squad Carrier (LASC). A comparison of some of the characteristics of these two vehicles indicate apparent similarities except for cost.

Designation/ Acronym	Status	Troop Capacity	Weight (tons)	Can Swim	Armor Protect. Level	Speed Road/CC (mph)	Unit Pgm. Cost Est. ($000)
M113 ---	In Serv	12	13	Yes	7.62	40/19	$152
LASC ---	Dev	9-11	14.5	Yes	7.62	50/?	438

The Army appears to remain uncertain as to what the troop carrying capability of an armored personnel vehicle should be as well as what the appropriate size of an infantry squad should be. Although an Army squad basically consists of 11 troops new Army vehicles being considered may carry less, for example, the troop capacity requirement for the new LASC is a minimum of 9 with 11 desirable. The M2 Infantry Fighting Vehicle also carries only nine troops. While Army officials acknowledge they are presently conducting a study to determine "mechanization requirements" it is obvious that as vehicle capacity shrinks more vehicles will be required.

The addition of cannons and other sophisticated hardware substantially increases cost and deleteriously affects the basic transport function of an armored personnel carrier. For example, the Army's addition of a 25mm cannon and TOW antitank missile to the M2 Infantry Fighting Vehicle has substantially increased its cost and limited its troop carrying capability.

Both the Army and the Marine Corps, independent of each other, are acquiring armored vehicles to transport troops. Both the Army's Tank Automotive Command (TACOM) and the Navy's Naval Sea Systems Command (NAVSEA) on behalf of the Marine Corps, are

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procuring armored vehicles from FMC Corporation. Although those vehicles differ somewhat, Marine Corps officials state that LVT-7 vehicles are designed for 80 percent use on land and are unique for the 20 percent amphibious assault role. Similarities should therefore exist and economies should be attainable by consolidation of the acquisition function.

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TABLE 5

FIGHTING VEHICLES

Description	Design ation/ Acronym	Service	Status	Troop Capa- city	Weight (tons)	Main Gun	Machine Gun	Can Swim	Armor[1] Protect. Level (mm)	Speed Road/CC (mph)	Unit[2] Pgm Cost Est. $(000)
Inf Fighting Veh*	M2	Army	Prod	9	25	25mm	7.62mm	Yes	14.5	41/31	$1,800
Cav Fighting Veh*	M3	Army	Prod	5	25	25mm	7.62mm	Yes	14.5	41/31	1,800
Mob Prot Gun-Near	MPG-N	Army	Dev	3	14.5	25mm	—	Yes	7.62	50/?[6]	900+
Mob Prot Gun Sys	MPGS	Army/ Marines	Dev	3	16-21[3]	75-105mm	7.62mm	No	14.5	45/?[6]	1,800+
Lt Arm Veh(Lt Aslt)*	LAV(LA)	Marines	Dev	9	14.5	25mm	—	Yes	7.62	50/?[6]	799[4]
Lndg Veh Trkd(Pers)*	LVT-X(P)	Marines	Dev	17-28	?	25mm	7.62mm	Yes	7.62+	45/31	2,000[5]

* Multifunction vehicle.

1. Armor column numbers denote general calibre range of ammunition vehicle is protected against.
2. All unit cost estimates are in 1980 or later dollars or 1983 budget estimates and are generally unit program costs. In some cases all program costs, e.g., research and development, initial spares, etc. were not readily discernable.
3. Army requirements indicate 19-21 tons; Marine requirements indicate 14.5-16 tons. OSD has directed the program to become a joint Army-Marine program.
4. Unit program cost is based on total buy of all variants, costs of specific variants will differ.
5. Investigative Staff estimate based on current costs of LVT-7 and M2/M3 and contractor discussions.
6. No cross country speed specified in LAV, MPGS programs.

Observations

There are an inordinately large number of vehicles being planned and developed to perform combat roles. Many of these seem to have similar basic characteristics, (e.g., cannon size and speed).

Some of these multifunction vehicles (e.g., the M2 and LAV-LA) have different levels of armor protection. In close combat encounters, the degree of troop vulnerability appears to be intimately related to the type of personnel carrier in which they ride to battle. This is particularly so with respect to the M2 which is reportedly to accompany M1 tanks into battle yet whose armor protection is substantially less than the M1. Other vehicles, such as the MPG-N, appear to be singularly fighting vehicles (or light tanks) which will operate in a combat environment in consonance with associated troops in separate personnel carriers.

The M2 and M3 vehicles have an antitank missile capability while the others do not. The multiple capabilities of these vehicles substantially increase their costs.

Army officials stated the requirement for some of these vehicles, notably the MPG-N, is to provide an easily transportable armor capability. They admit the M2/M3 vehicles could readily accomplish the MPG-N mission requirements but were deemed unacceptable because of their limited transportability. The M2/M3 turret and other components must be removed to transport them in C130 aircraft and their weight distribution is excessive for a C141B aircraft.

Army officials acknowledge that little analysis has been done regarding the MPG-N requirement and also that a conflict exists within the Army concerning the characteristics and real requirement for this program.

The MPGS vehicle being planned, though similar in some basic characteristics to the MPG-N, differs greatly in cannon size. The MPGS cannon size approaches that of a battle tank. Additionally, this cannon is not currently being produced and will, therefore, require separate development and add to the cannon/ammunition inventory requirement.

There is considerable conflict between the Army and Marine Corps concerning the weight, cannon size and armor protection required for the MPGS. OSD directed that the Army and Marine Corps consolidate their efforts for this program, as well as the LAV/MPG-N progams, but conflict remains and the outcome is still in question.

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TABLE 6

BATTLE TANKS

Description	Designation/ Acronym	Service	Status	Weight (tons)	Main Weapon Size (mm)	Main Weapon Ammo Stowage in RDS	Can Swim	Armor[1] Protect. Level	Speed Road/CC (mph)	Unit[2] Program Cost Est. ($000)
Sheridan Tank	M551	Army	In Serv	18	155/ missile	20 9	No	14.5mm	43/20	X[4]
Main Battle Tank	M48	Army	In Serv	54	105	54	No	Heavy	30/15	X[4]
Main Battle Tank	M60	Army/ Marines	In Serv	52.5	105	63	No	Heavy	30/15	$1,118
Main Battle Tank	M1	Army	Prod	60	105	55	No	Heavy+	45/35	2,660
Main Battle Tank[3]	M1E1	Army/ Marines	Dev	64	120	40	No	Heavy++	45/35	2,660+

1. Armor column numbers denote general range of ammunition vehicle is protected against.

2. All unit cost estimates are in 1980 or later dollars or 1983 budget estimates and are generally unit program costs. In some cases all program costs; e.g., research and development, initial spares, etc., were not readily discernable.

3. The M1E1 is included in this chart for comparison as it represents major changes being planned. It is not specifically identified on other charts included in this survey.

4. "X" denotes no recent production therefore no meaningful cost estimate available.

Observations

The M60 series tanks are scheduled to remain in service through the year 2000 despite the contention of some Army officials that the M60 is inadequate to meet the "threat." Considerable money is being spent to convert M60A1 tanks to M60A3 models which provide only minimal enhancement. As previously noted, the manufacturer of the M60 tanks and another contractor contend that it is technologically and economically feasible to further upgrade the M60 yet no program has been established for this purpose reportedly because of potential jeopardy to the acquisition of M1 tanks and M2/M3 Fighting Vehicles.

The Army is developing the M1E1 tank which has a marginally larger gun than the M1. Unfortunately achieving the slightly increased fire power will create a negative operational impact because the M1E1 holds only 40 rounds of ammunition, 15 rounds less than the M1.

Because of conflicting viewpoints within the Army concerning force structure, deployability and maneuverability the total quantity of M1 tanks to be procured (7,058) is questionable and is reportedly the subject of another study to be conducted by yet another Army Chief of Staff task force.

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TABLE 7

FIRE SUPPORT

Name	Designation/ Acronym	Service	Status	Chassis	Weight (tons)	Gun/ Missile	Can Swim	Armor[1] Protect Level	Speed Road/CC (mph)	Unit[2] Pgm. Cost ($000)
Mortar Carrier	M125	Army	In Serv.	M113	12.3	81mm	Yes	7.62mm	40/19	$ 182
Mortar Carrier	M106	Army	In Serv.	M113	13.1	4.2in	Yes	7.62mm	40/19	181
Howitzer Medium	M109	Army/MC	In Serv.	M109	26.7	155mm	No	7.62mm	35/19	473
Howitzer Heavy	M110	Army/MC	In Serv.	M110	29.2	8in	No	7.62mm	34/18	645
Vulcan Gun Carrier	M741	Army	In Serv.	M113	12.9	20mm	Yes	7.62mm	42/19	289
Improved TOW Vehicle	M901	Army	In Serv.	M113	13	TOW	Yes	7.62mm	40/15	377
LANCE Missile Carrier	M667	Army	In Serv.	M113	12	LANCE	Yes	7.62mm	42/19	X[6]
CHAPPARAL Guid. Mis. Car.	M730	Army	In Serv.	M113	13.9	CHAPPARAL	Yes	7.62mm	38/19	1,256
Inf. Fighting Veh.*	M2	Army	Prod.	FVS	25	25mm/TOW	Yes	14.5mm	41/31	1,800
Cavalry Fighting Veh.*	M3	Army	Prod.	FVS	25	25mm/TOW	Yes	14.5mm	41/31	1,800
Mult. Launch Rocket Sys.	LMRS	Army	Prod.	FVS	25	Missile	No	14.5mm	40/31	1,820
ROLAND Missile Car.[3]	XM975	Army	Prod.	M109	27	ROLAND	No	7.62mm	41/19	[3]
Div. Air Def. Veh.	DIVAD	Army	Dev.	M109	63	dual 40mm	No	Heavy	30/15	4,610
Lt. Arm. Veh. Anti-Tank	LAV-(AT)	Marines	Dev.	LAV	14.5	TOW	Yes	7.62mm	50/?[5]	799[4]
Lt. Arm. Veh. Mortar	LAV-(M)	Marines	Dev.	LAV	14.5	81mm	Yes	7.62mm	50/?[5]	799[4]
Lt. Arm. Veh. Air Defense	LAV-(AD)	Marines	Dev.	LAV	14.5	Gun/Miss.	Yes	7.62mm	50/?[5]	799[4]
Lt. Arm. Veh. Assault Gun	LAV-(AG)	Marines	Dev.	LAV	14.5	75-105mm	Yes	7.62mm	50/?[5]	799[4]

* Multifunction vehicle.
1 Armor column numbers denote general calibre range of ammunition vehicle is protected against.
2 All units cost estimates are 1980 or later dollars or 1983 budget estimates and are generally unit program costs. In some cases all program costs, e.g., research and development, initial spares, etc., were not readily discernible.
3 Contract for armored vehicle recently discontinued. Total cost for 27 vehicles was $12.2 billion.
4 Unit program cost based on total buy of all variants, costs of specific variants will differ.
5 No cross country speed specified in LAV program.
6 "X" denotes no recent production therefore no meaningful cost estimate available.

This grouping contains armored vehicles associated with both artillery and air defense capability. These capabilities can be described as a second layer "stand off" capability as opposed to "close encounter" direct combat. The M2 and M3 infantry/cavalry fighting vehicles were also included because their missile launching capability permits them to perform in this role. All of these vehicles, however, are considered to be part of a "combat maneuver force" which should function with tanks, fighting vehicles and personnel carriers as a "combined arms team."

Observations

The Army and Marine Corps are to have the TOW missile system mounted on four different armored vehicles. (Another unarmored wheeled vehicle, the HMMWV with TOW also exists.) A comparison of the characteristics of vehicles indicate a large degree of similarity except for cost.

Designation	Status	Weight (tons)	Can Swim	Armor Protect. Level	Speed Road/CC (mph)	Unit Pgm. Cost Est. ($000)
M901 ----	In Serv	13	Yes	7.62	40/19	$ 377
LAV(AT) -	Dev	14.5	Yes	7.62	50/?	799
M2/M3 ---	Prod	25	Yes	14.5	41/31	1,800

The LAV(AT) being developed by the Marine Corps is similar to the M901, especially in terms of weight. At 13 tons, the M901 appears to be equally as deployable as the LAV(AT) which is to weigh approximately 14.5 tons. In addition to weight comparability the M901 is less costly, is in production and can be supported by the current supply system.

There appears to be a duplication of armored artillery vehicles. For example, a comparison of two 81mm mortar vehicles indicates a large degree of similarity.

Designation	Status	Weight (tons)	Can Swim	Armor Protect. Level	Speed Road/CC (mph)	Unit Pgm. Cost Est. (000)
M125 ----	In Serv	12.3	Yes	7.62	40/19	$ 182
LAV(M) --	Dev	14.5	Yes	7.76	50/?	799

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There are also five different types of air defense armored vehicles: Vulcan, Chapparal, Roland, DIVAD, and LAV(AD). In addition to these, the Air Force is planning to conduct a feasability demonstration in FY 1982 of a "mobile weapon system" which is yet another air defense vehicle using the M113 armored personnel chassis as the basic vehicle. It would seem that many of these mortar, missile and air defense vehicle requirements should be common to the Army, Marine Corps, and Air Force.

Although the existing M113 vehicle has not been considered by the Army for adaptation to their new armored vehicle requirement it obviously has been considered good enough for the fire support role. Several of the missile launching platforms employ this reportedly excellent armored chassis as does the new improved TOW vehicle.

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TABLE 8

COMBAT SUPPORT

Description	Designation/ Acronym	Service	Status	Chassis	Weight (tons)	Machine Gun	Can Swim	Armor[1] Protect Level	Speed Road/CC (mph)	Unit[2] Pgm. Est. Cost ($000)
Recovery Vehicle	M578	Army	In Serv.	M110	27.0	.50 cal	No	7.62mm	37/18	$ 410
Recovery Vehicle	M88	Army	In Serv.	M88	56.0	.50 cal	No	7.62mm	30/20	1,710
Cargo Carrier	M548	Army	In Serv.	M113	14.2	.50 cal	Yes	7.62mm	38/20	168
Cmd. Post Carrier	M577	Army	In Serv.	M113	12.1	.50 cal	Yes	7.62mm	40/19	179
Arm. Veh. Launch Bridge	M60AVLB	Army	In Serv.	M60	52.5	—	No	Heavy	30/15	X[7]
Arm. Veh. Launch Bridge	M48AVLB	Army	In Serv.	M48	54.0	—	No	Heavy	30/15	522[5]
Combat Engineer Veh.	M728	Army	In Serv.	M60	57.5	105mm[4]	No	Heavy	30/15	916
Landing Veh. Tracked Com.	LVTC-7	Marines	In Serv.	LVT-7	22	7.62mm	Amphb	7.62mm	40/20	1,330[6]
Lndg. Veh. Trkd. Recovery	LVTR-7	Marines	In Serv.	LVT-7	25	7.62mm	Amphb	7.62mm	40/20	1,330[6]
Field Art. Arm. Sup. Veh.	FAASV	Army	Dev.	M109	28.8	—	No	7.62mm	35/19	521
Arm. Fwd. Area Rearm Veh.	AFARV	Army	Dev.	FVS	28.0	—	No	14.5mm	38/30	915
Armored Refueler Vehicle	ARV	Army	Dev.	FVS	16.0	—	No	14.5mm	38/30	?[7]
Maintenance Assist Veh.	MAV	Army	Dev.	FVS	16.0	—	No	14.5mm	40/30	?[7]
Medical Evacuation Veh.	MEV	Army	Dev.	FVS	16.0	—	No	14.5mm	40/30	?[7]
Fire Integ. Spt. Team Veh.	FISTV	Army	Dev.	M113	13.0	—	Yes	7.62mm	40/15	449
Lt. Arm. Recovery Veh.[3]	LARV/ LAV(R)	Army/ Marines	Dev.	LAV	14.5	7.62mm	Yes	7.62mm	50/?[9]	475/ 799[6]
Lt. Arm. Veh. (Logistics)	LAV(L)	Marines	Dev.	LAV	14.5	7.62mm	Yes	7.62mm	50/?[9]	799[6]
Lt. Arm. Veh. (Command)	LAV(C)	Marines	Dev.	LAV	14.5	7.62mm	Yes	7.62mm	50/?[9]	799[6]
Lndg. Veh. Trkd. Command	LVT-X(C)	Marines	Dev.	LVT-X	?	7.62mm	Amphb	7.62mm	45/31	1,800[8]
Lndg. Veh. Trkd. Recovery	LVT-X(R)	Marines	Dev.	LVT-X	?	7.62mm	Amphb	7.62mm	45/31	1,800[8]
Lndg. Veh. Trkd. Engineer	LVT-X(E)	Marines	Dev.	LVT-X	?	7.62mm	Amphb	7.62mm	45/31	1,800[8]
Arm. Combat Earthmover	M9	Army	Dev.	M9	27	—	Yes	7.62mm	30/20	600

1 Armor column numbers denote general calibre range of ammunition vehicle is protected against.
2 All unit cost estimates are in 1980 or later dollars or 1983 budget estimates and are generally unit program costs. In some cases all program costs, e.g., research and development, initial spares, etc., were not readily discernable.
3 Army and Marine Corps designations differ for this vehicle.
4 Vehicle equipped with 105mm tank gun.
5 Includes only conversion costs.
6 Unit program cost is based on total buy of all vehicles, costs of specific variants will differ.
7 Denotes no recent production, therefore, no meaningful cost estimates available.
8 Investigative Staff estimate based on current costs of LVT-7 and M2/M3 and contractor discussions.
9 No cross country speed specified in LAV program.

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Observations

Several of these vehicles appear to fulfill the same function, and a comparison of the characteristics reveals a large degree of similarity between functional models.

COMMAND POST VEHICLES

Designation	Status	Weight (tons)	Can Swim	Armor Protect. Level	Speed Road/CC (mph)	Unit Pgm. Cost Est. ($000)
M557 ----	In Serv	12.1	Yes	7.62	40/19	$ 179
LAV(C) --	Dev	14.5	Yes	7.62	50/?	799
LVTC-7 --	In Serv	22	Amphib	7.62	40/20	1,330
LVTX(C) -	Dev	?	Amphib	7.62+	45/31	1,800

ARMAMENT/REARM VEHICLES

FAASV ---	Dev	28.8	No	7.62	35/19	$ 521
AFARV ---	Dev	28.0	No	14.5	38/30	915

There are also two logistics vehicles, the partially armored M588 and the LAV(L). Five different recovery vehicles with varying capabilities are also indicated.

There is considerable variance in the armor protection and speeds of these vehicles.

The ability of vehicles to "swim" appears to be an inconsistent requirement as does the gun size and degree of armor protection.

The M113 family is being expanded to include a new combat vehicle, the Fire Support Team Vehicle (FISTV).

The Army is planning to use the M2/M3 armored vehicle chassis as the genesis for a family of combat support vehicles.

The Marine Corps is planning to develop several combat support vehicles within the LAV family.

The M578 recovery vehicle, currently in Army organizations scheduled to receive the M2/M3 vehicles and once considered suitable for recovery operations, is inadequate because of the weight of the M2/M3 vehicles. It is being replaced by the more expensive M88 recovery vehicles which in the past, was used only by units with battle tanks and self-propelled artillery.

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Attempts to address the shortfall in combat support vehicles cited previously is demonstrated by the fact that more than 50 percent of the armored combat support vehicles listed in the above table are in development.

New Families or Armored Vehicles

Historically, when an armored vehicle was developed it has become the basic vehicle for a number of alternate vehicles referred to as "variants" thereby building a "family" of armored vehicles over a period of time. Evidence of this can be seen in the extensive use of the basic M113 chassis for a number of other armored vehicle configurations. This "family" concept is viable if:

(a) The variant requirements are based on a realistic need and simply not the desires of a proponent Army activity.

(b) The "families" themselves are not duplicated.

(c) Realistic, cost effective analyses of existing "family" capabilities are accomplished within and between services when new requirements are conceived to avoid unnecessary development of new vehicles and families of vehicles.

At the present time two distinct major "families" exist (the M113 and LVT-7). One new family is in production, the FVS family, and at least two new families are being proposed, the LAV/MPG-N family which appears to have independent Army-Marine variant requirements and the LVT(X) family. Additionally, early planning indicates that the MPGS may also have a family of variants. At the same time, new armored vehicles are currently being developed and acquired from the existing M113 family as well. As evidenced by the previous five comparative charts, many of the vehicles in the new families have basic characteristics not much different from those in the existing M113 family. The following chart shows that in many cases vehicles from two or more families are intended to perform similar functions.

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TABLE 9

COMPARISON OF EXISTING AND PLANNED VEHICLE FAMILIES

	Army			Army/Marine		Marine	
Variant	M113 Family	FVS Family	Other Vehicle Groups[1]	MPG-N	LAV	LVT-7	LVT-X
Armored Personnel Carrier	M113	M2		LASC	LAV(LA)	LVTP-7	LVT-X(P)
Cavalry Scout Vehicle	M113	M3		MPG-N			
Fighting Vehicle		M2, M3		MPG-N	LAV(LA)		LVT-X(P)
Missile Launch Vehicle (Artillery)	M667	MLRS					
Missile Launch Vehicle (Air Defense)	M730		ROLAND		LAV(AD)		
Missile Launch Vehicle (Anti-Tank)	M901	M2, M3			LAV(AT)		
Mortar Carrier	M106, M125				LAV(M)		
Fire Support (cannon) Vehicle			M109, M110		LAV(AG)		
Air Defense Gun Vehicle	M741		DIVAD		LAV(AD)		
Command Vehicle	M577				LAV(C)	LVTC-7	LVT-X(C)
Forward Observer Vehicle	FISTV						
Engineer Vehicle			M9, M728				LVT-X(E)
Ammo Resupply Vehicle		AFARV	FAASV				
Refuel Vehicle		ARV					
Logistics Vehicle	M548				LAV(L)		
Maintenance Vehicle	M113	MAV					
Recovery Vehicle			M578, M88	LARV[2]	LAV(R)	LVTR-7	LVT-X(R)
Medical Vehicle	M113	MEV					

[1] Developed by Army--some also used by Marines.
[2] Army and Marine Corps use different designations for the same vehicle.

The development of a new family of combat vehicles would not be questionable if the vehicles were shared to the greatest extent possible and replaced a large segment of the existing inventory. Unfortunately, this does not seem to be the case. Army and Marine Corps planning documents indicate that most of these new vehicles will not replace existing inventory but rather will substantially add to the armored combat vehicle inventory well into the 1990's. The following chart indicates the net increase in the types of major armored vehicles in inventory over the next 10 years. Numbers in this chart do not directly correspond to numbers in previous charts because as in Table 3, multifunction vehicles are only counted once.

TABLE 10

TYPES OF MAJOR ARMORED VEHICLES IN INVENTORY

	1981	1986	1991
Army:			
Battle Tanks	3	4	2
Personnel Carriers	1	2	2
Fighting Vehicles	0	3	4
Fire Support	8	10	10
Combat Support	7	11	15
Army Total	19	30	33
Marine Corps:			
Battle Tanks	1	2	2
Personnel Carriers	1[1]	1[1]	1[1]
Fighting Vehicles	0	1[1]	3[2]
Fire Support	2	6[4]	6[4]
Combat Support	4[2]	7[4]	10[7]
Marine Corps Total	8	17	22
Combined Army/Marine Totals[1]	22	40	47

[ ] = Marine unique.

[1] Adjusted for vehicles common to Army and Marine Corps.

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Acquisition of these new vehicles will impose a heavy cost burden throughout the 1980's and 1990's. In addition, providing some of these vehicles with a multiple role capability through the addition of multiple armament and sophisticated systems disproportionately adds to the cost of acquiring new vehicles comparatively similar in function to existing vehicles (e.g., M2/3 vs. M113). Operating and supporting the new vehicles once they are fielded will require large allocations of resources in the mid-1980's and beyond (e.g., M1 support has already required additional trucks, the ACE bulldozer, etc.). Since operation and support costs are generally greater than the acquisition cost of a vehicle and span a much longer period of time the affordability issue relative to these new vehicles is greatly compounded.

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Report of February 17, 1982

ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP)

The Army is rushing into Full Scale Engineering Development of its Army Helicopter Improvement Program through major modification to the OH-58A Scout Helicopter despite the fact that test results have shown a minimum application in the mission roles perceived for the aircraft.

History and Development of the AHIP

The Army Helicopter Improvement Program represents an interim step in plans by the U.S. Army to field a completely new Advanced Scout Helicopter (ASH) during the 1990's. Fiscal constraints and the uncertainties involved in attempting to produce an aircraft which would incorporate state-of-the-art improvements in airframe design, light weight materials, and navigation, communication and target acquisition equipment, forced the Army to drop earlier plans to move directly from its present scout helicopter to the ASH. While the projected performance level of the Near Term Scout Helicopter (NTSH), (the modified helicopter which would result from the Army Helicopter Improvement Program) is less than that planned for the ASH, the Army views it as the most timely solution to the major performance deficiencies it sees in its present inventory of scout helicopters.

Current Scout Helicopters
Pre-Vietnam Design

The current scout observation helicopter inventory is a mixture of Hughes Helicopter Company (Hughes) OH-6 and Bell Helicopter Company (Bell) OH-58 models. In 1962, Hughes was awarded a contract to build 1,071 OH-6A's for the Army. An additional 342 were purchased as an option to that contract between 1966 and 1970 for a total of 1,413. In 1967, Bell was awarded a contract to build 2,200 model OH-58A's. A follow-on contract was awarded in 1977 to replace the engine and upgrade the communication equipment in 585 of the OH-58A's, which were then designated model OH-58C. To date, 275 OH-58A models have been modified with the remaining 310 conversions to be accomplished in Europe by European subcontractors to Bell.

Normal attrition and combat losses in Vietnam have reduced the Army inventory of scout helicopters to 403 OH-6's (46 active Army, 357 in the National Guard) and 2,002 OH-58's (1,389 active Army, 613 in the National Guard and Reserves). Because of their low performance characteristics, the 46 OH-6's assigned to the Active Army are classified as light observation helicopters and are not counted against the Army's authorized requirement of 1,472 scout helicopters.

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The modification program increased the performance levels of the OH-58C to a degree but not to the extent which the Army now considers to be essential for the near-term support of its combat units for several reasons:

(1) Current scout helicopters are capable of visual good-weather/daylight target acquisition only, aided solely by use of conventional hand-held binoculars. As a result, current scout helicopters are at times unable to gain line of sight to a target at maximum standoff range (that distance considered to be outside the effective range of Soviet ground-to-air weapons).

(2) Performance levels of the present scout helicopter are considered to be inadequate for nap-of-the-earth (NOE) flying, a tactic which will be employed by scout and attack helicopters in future combat zones as a means of remaining below the detection altitute of enemy radar.

(3) Current scout helicopters lack the capability for precision navigation, especially at low altitudes, and are also unable to precisely determine target map coordinates.

(4) Performance level of existing on-board communications equipment degrades as the scout helicopter descends into NOE flight.

(5) Relatively high workload encountered in flying the current scout helicopter in NOE flight impairs the ability of the crew to concentrate outside the cockpit in a battlefield situation.

Although the Army considers both models of the OH-58 to be unsuited for NOE flight, they can, in fact, be flown at NOE levels on a normal day at relatively low altitudes. The OH-58A is not capable of NOE flight on a high/hot day (4,000' at 95°) and the performance of the OH-58C in that condition would be minimal at best. Army officials are concerned about the low performance levels of the current scout on a high/hot day because of the possibility of deployment to the Near East where such conditions are fairly common. It should be noted that the OH-58C is able to perform quite well in conditions normally encountered over the Central European land mass.

Requirement for Advanced Helicopter Established in 1974

In January 1974, the Army approved a Required Operational Capability (ROC) statement for a new scout which was designated the Advanced Scout Helicopter or ASH.

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In 1976, a Defense Systems Acquisition Review Council (DSARC) agreed that the Army had a supportable need for the ASH and decided that the ASH program should include the development of a Target Acquisition and Designation System (TADS) that would be common to both the ASH and the new attack helicopter, the AH-64. Congress denied funding for the ASH in FY 1977 but funded the ASH program in FY 1979.

During the latter part of 1978, the Army updated the ASH ROC and decided that instead of incorporating the TADS into the ASH, it would further develop the emerging Mast Mounted Sight (MMS) technology which would permit the placement of a sensor package (television, infrared sensor, laser range finder/target designator) similar to that of TADS.

On September 30, 1979, an Army Systems Acquisition Review Council (ASARC) confirmed the need for ASH but decided that the program could no longer be supported in light of budget constraints. The ASARC further recommended that the continuing need for an improved scout helicopter be met by incorporating the MMS into an existing airframe. That decision was approved by the Secretary of Defense in late 1979 and, in late 1980, the Army released a solicitation package to industry for the modification of the only two existing airframes it felt would be suitable for the surrogate ASH role, the OH-6A and OH-58A. The only respondents to that offer were Hughes and Bell. On September 21, 1981, the Army awarded Bell a Fixed Price Incentive (FPI) contract to complete full scale engineering development (FSED) of the NTSH which would be an extensive modification of the Bell model OH-58A.

Cost

According to the contract Bell Helicopter is designated the System Prime Contractor (SPC) with full responsibility for the OH-58A modification and the development of the mast mounted sight. The terms of the contract provide a target price of $148,004,235 with a ceiling price of $182,747,885. The share ratio is 75 percent for the Army and 25 percent for the contractor. The contract also contains escalation clauses for labor and material costs. The FSED phase of the contract calls for five prototype helicopters to be delivered with first flight testing planned for June 1983.

The unique aspect of the contract is found in the production options which call for a target cost of $1,117,000 for each complete unit based on a total buy of 720 helicopters. The cost of the MMS ($573,000) is included but the costs of the engine and advanced avionics, some of which are still in development, are not. While this contract might ensure a lower production price, it necessitates the production options being exercised prior to the completion of prototype testing. This results in 18 months concurrency.

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A termination of the contract by March 31, 1982, without exercising production options would result in a payment of approximately $25 million to the contractor. This termination amount increases significantly thereafter.

While the contractor believes that he is taking all the risks in this contract and that he will meet the firm target price, excessive concurrency presents a danger of considerable cost increase to the Army for both development and production phases of the contract. Even though the Army and the contractor are of the opinion that the technical risks involved with the modification and adaption of proven systems are low, the successful marriage of the airframe and electronics has yet to be proven in flight. The OH-58A will be modified to such extent that it will be a new aircraft. Further, the MMS has not yet been demonstrated in an in-flight compatibility with the airframe. It is inevitable that changes will be needed that will increase cost. Moreover, the magnitude of the costs can increase if final testing mandates changes for the production aircraft components that are already in various stages of production.

NTSH Mission Roles: Tactical Surveillance, Reconnaissance, Target Acquisition, Command, Communication

The planned roles for the NTSH are essentially the same as those for the current scout helicopters. They are: (1) locate enemy armor for destruction by attack helicopters; (2) operate as a forward aerial observer for artillery units, and (3) support the movement of air cavalry. The Army rationalizes the need for the NTSH for basically the same reason that the current generation of scout helicopters has been justified--it is an essential element in the execution of command, control and prosecution of the combined arms battle in the area 0-5 kilometers in front of the Forward Edge of the Battle Area (FEBA), also known as Zone I.

The Army questioned the survivability of the current scout helicopter in that area of the modern battlefield, and designed the NTSH to offer certain refinements in the way those roles are performed. The most notable change is the ability to acquire targets through the day/night optical system located in the MMS and the capacity for laser designating targets for destruction by laser-seeking weapons such as the HELLFIRE missile and COPPERHEAD artillery round.

Extensive Modification Needed to Upgrade OH-58 Performance

In order to field an aircraft capable of performing the traditional scout role against an advanced threat, while carrying the added weight of the mission equipment package, extensive modifications are required. The conversion process consists of completely stripping the OH-58A and, in effect, constructing a

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new helicopter in its place. The planned modification includes the installation of the MMS and the removal and replacement of the engine, tail rotor, transmission, gear boxes, hydraulic system, fuel cell, communications gear, instrument panel, passenger compartment, and all the electrical wiring.

The OH-58A avionics suite will be significantly upgraded. A visual navigation display screen is to be incorporated into the new instrument panel which will show the projected flight path of the helicopter and allow for periodic position updating through the laser range finder in the MMS. The display screen will also show real time images produced by the day television camera and the night Forward-Looking-Infrared (FLIR) system located in the MMS. The improved Doppler navigation system is expected to provide position and accurate target locations. An automatic target handoff feature is to be integrated with the navigation and communication system that is designed for autonomous, computer-to-computer handoff of target locations from the NTSH to the AH-64 or to artillery units.

Army Convinced NTSH Performance Will Reduce Vulnerability

In addition to the MMS, the Army believes NTSH survivability will be enhanced through the use of (1) damage tolerant composite rotor blades, (2) elimination of rotor blade flicker, (3) a new "run dry" transmission capable of operating for a short period without transmission fluid, (4) a radar warning device capable of detecting a lock-on by enemy radars, and (5) additional engine armoring and a self-sealing fuel cell. In all, the Army estimates the NTSH design will reduce vulnerability (as compared to the OH-58A) to a 7.62mm hit by 59 percent and 37 percent against a 12.7mm hit.

To put the extent of the NTSH modification into perspective, a representative of Bell Helicopter estimated that the Army could purchase a completely new helicopter for about $100,000 more than the final per unit cost if the Army exercises its options to buy all 720 of the desired NTSH's.

Performance Comparisons

A comparison of the OH-58A and the OH-58C actual performance levels with that projected for the NTSH shows the greatest difference to be in improved mission gross weight and high/hot day vertical rate-of-climb. The following chart details this comparison:

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COMPARISON OF OH-58A, OH-58C AND NTSH PERFORMANCE LEVELS

	OH-58A	OH-58C	Projected NTSH Performance
Mission gross weight	2,850 lbs	2,245 lbs	4,016 lbs
Maximum gross weight	3,000 lbs	3,300 lbs	4,500 lbs
Vertical Rate of Climb			
2,000' at 70°	90' per minute	500' per minute	650' per minute
4,000' at 95°	0' per minute	110' per minute	500' per minute
Endurance (hrs)	2.4	2.4	2.4
Airspeed (knots)	100	100	112
NOE controlled flight (knots)	NA	NA	35

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The more powerful engine in the NTSH will allow for increased thrust at the tail rotor which, with the planned stability control augmentation system, will make the NTSH relatively more stable and controllable in a hover or in NOE flight. The ability of a scout helicopter to hover within the confines of extremely tight terrain features, and to move nimbly at NOE flight levels in order to avoid obstacles or the sudden appearance of threat forces is one of its most important qualities.

Mast Mounted Sight (MMS)

MMS Components

The MMS is a sphere constructed of composite material. This sphere houses a sensor package consisting of a day Television Subsystem (TVS) Telescope, a night/poor visibility Thermal Imaging System (TIS) telescope, and a Laser Range Finder/Designator (LRF/D), which is mounted on a stablization platform.

The TVS is a special purpose television camera and a telescope. The TIS was designed using DOD common modules and optics to produce a thermal image. The LRF/D is a medium power laser that was derived from proven designs and shares a common aperture with the TVS to maintain boresight (optical alignment) stability. An onboard boresight assembly allows inflight optical boresighting of the TIS and TVS to the LRF/D.

The MMS provides target line-of-sight angles, angle rates, and range data to the navigation system. Using this data, the navigation system computes the map coordinates of the targets. The angle rate data also permit the system to compute speed and direction of moving targets. This target information can be passed to an attack helicopter or an artillery unit.

Both the pilot and observer have a video display. They can simultaneously view the TVS or TIS or one crewmember can look at the TVS while the other observes the TIS. A set of pushbutton switches surrounding each multifunction display permits each crewmember to call up a variety of display data and to control many of the functions of the NTSH.

Army's Performance Requirements Could be Improved

In its initial performance requirement document, the Army included a schedule of minimum and desired target acquisition/laser designation range requirements for clear day and night conditions to detect and recognize a tank size target.

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The required ranges are those the Army considers to be the minimum performance level; the desired ranges are those it would like to attain within the constraint of limited funding. The contractor (Bell) is contractually bound to provide a MMS which will perform only at the required ranges. Bell has estimated that the MMS, once developed and mounted on the NTSH, should perform at a detection and recognition level higher than the Army's requirements. Projected MMS performance levels equal or exceed the Army's desired capabilities in only a single function--laser designation.

Needed Improvements in MMS Already Identified by Army

The Army has identified several features which would improve MMS performance up to the desired performance level including:

a. Larger sensor apertures to provide for higher magnification and a wider field-of-view for the TVS and TIS.

b. A laser spot tracker which will improve the automatic target handoff capability now in development, from scout helicopter-to-scout helicopter or from scout helicopter to attack helicopter.

None of the above features have been included in FSED or are planned for the production phase of the MMS. It appears the Army is foregoing the inclusion of a number of important capabilities into its proposed MMS for the sake of getting something into the field as quickly as possible.

MMS is Incompatible with Perceived HELLFIRE and COPPERHEAD Mission Roles

The NTSH ROC requires that accuracy and interoperability shall be compatible with several weapons. This is not the case.

Army officials advised that forward artillery batteries will normally be positioned 3km behind the FEBA. An Army official also advised that the COPPERHEAD's currently established effective ranges fall between 3km and 16km. A comparison of the maximum range of 16km, and the 3km laser designation range requirement contained in the NTSH ROC, indicates that a NTSH operating in the vicinty of the FEBA would fall short of being able to designate for COPPERHEAD at its maximum range. Moreover, despite the Army contention that NTSH will be used to designate for COPPERHEAD, Army artillery officials are largely unfamiliar with the operational capabilities of the NTSH MMS and they had little input in developing MMS requirements. Therefore, the utilization of the NTSH as a target designator for COPPERHEAD and HELLFIRE will, by the nature of the NTSH's tactics and capabilities, lessen its effectiveness.

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MMS Contributes to
NTSH Crew Workload

The additional aircrew workload required by the MMS operation, will undoubtedly reduce the crew's flexibility in reacting to inflight emergencies, obstacles in the flight path, equipment failures and undetected threats. It should be noted that, unlike the TADS in the AH-64, the NTSH crew will not be able to fly the helicopter using only the TVs or TIS screens. Flight crew attention will be divided between the electronic screens and outside the helicopter.

In 1977, an Army Human Engineering Laboratory investigation concluded that when acquiring targets with a system like the MMS, the observer would not be able to assist the pilot in navigating the aircraft. It also concluded that due to the high workload imposed by NOE flight, the crew would not have enough time to scan instruments for symptoms of an emergency condition. Any inflight emergency, such as engine or rotor failure, would also likely leave the crew with very few options and almost no decision time. An operational suitability evaluation conducted by the Army in June 1980 verified the Human Engineering Laboratory's earlier conclusions.

The difficulty that the Army studies identified in operating a prototype MMS also apply to the NTSH MMS even though improved navigation and communication equipment and human engineering factors have been included. The crew workload has obviously increased and air crew flexibility and reaction time will necessarily be degraded. Although it is acknowledged that crew workload is exacerbated during NOE flight and MMS operation, the Army has not designated its solution as a priority.

Planned Army NTSH Deployment and Tactics--
Issues of Effectiveness and Survivability

The manner in which the Army plans to deploy the NTSH provides a clear indication of Army mission expectations. The NTSH will be deployed as follows: 421 aircraft or 58 percent will work with AH-64 attack helicopters, 208 aircraft or 29 percent will be assigned to artillery units and the remainder will be deployed alongside the AH-1S (Cobra). Clearly, the Army has placed great emphasis on the ability of the NTSH to operate effectively with the AH-64/HELLFIRE and COPPERHEAD weapon systems.

Kill Ratio is Insufficient

In an effort to determine its scout helicopter needs, the Army ran a series of mathematical wargames all of which indicated that the NTSH would survive longer and assist in more armor kills than the current scout. The most dramatic gaming results indicated that teaming the NTSH with the AH-64 would improve the kill ratio (enemy armor versus helicopter losses).

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Cost consideration aside, that degree of improvement would be noteworthy if such computer wargaming represented reality. An entirely different view was presented by another DOD study which analyzed Army helicopter needs and concluded that even if the NTSH is produced and the kill ratio projected for the NTSH/AH-64 team proves to be correct, it will fall far short of stopping a breakthrough by Soviet/Warsaw Pact armor in Central Europe. The study predicts that the Army would require a better kill ratio to blunt such an attack and posited that the only way even an NTSH/AH-64 team could achieve the needed kill ratio would be to improve its target handoff technique. The study examined the results of earlier Army helicopter tests and determined that the primary reason for the poor kill ratio was an unacceptably low, 12 percent rate of successful handoffs. The NTSH program does not directly address this problem and the improvements proposed for the NTSH navigation system and related avionics will not increase the probability of a successful target handoff.

NTSH/AH's Do Not Work Well Together

The need for the NTSH to operate in close conjunction with AH-64 results from poor Army planning. The Army's AH-64 weapons delivery system contains its own laser designator (TADS), however, it can only designate one target at a time. The AH-64 does have, however, a multi-launch capability with its HELLFIRE missile system. By teaming the NTSH with the AH-64, the Army envisioned gaining the multi-target designating capability that was not self-contained in the AH-64. In addition, it acquired a dedicated airborne laser target designator for indirect missions. On the surface, this appears to be laudatory. But, the Army's own testing has shown that in a target-rich battlefield environment, the NTSH will not play a target-designating role and is usually in the way of the AH-64. In the alternate scenario, the AH-64 will be stationed so far to the rear of the NTSH that its own laser designator will be ineffective. In either case, the Army is back to square one--multi-launch capability with a single target designation problem.

As an example of the present state of uncertainty over how the NTSH would be used with attack helicopters, Army officials initially advised that the NTSH would be physically located in an area up to but not across the front line while locating and handing off targets to the AH-64. When further questioned as to the logic of placing the lightly armored NTSH on the front while the heavily armored AH-64 sat in a concealed position approximately 2km behind those officials minimized the NTSH's degree of exposure by noting that it would be located over friendly forces and would use its MMS optics to maintain safe separation from the enemy. That scenario was later modified to include forward movement across the front as part of a coordinated surge of the entire combined arms team, i.e., infantry, armor, etc., in which case the NTSH would again be located above or only slightly in front of its own advancing ground elements and the AH-64.

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The exposure of the NTSH to enemy fire in the second scenario would appear to be increased dramatically. Even though the NTSH would participate in a forward surge as a member of the combined arms team, it would unquestionably be the leading aerial member of that team and, as such, would undoubtedly become the focus of enemy defenses. Such exposure does not bode well for the survivability of the NTSH.

One Army official noted that such a forward movement by a combined arms force would never occur without a preliminary bombardment of the area by artillery and Air Force close air support aircraft. Another official defended the survivability of the NTSH in such a situation as being increased because intelligence units would have located threats to the NTSH before the forward movement began. Paradoxically, according to the Army, one of the primary reasons for developing the NTSH in the first place is that it will provide ground commanders "real time" intelligence about the enemy. No conventional bombardment of an opposing force such as that anticipated to be found in Central Europe could be expected to completely eliminate threats to the NTSH. Although intelligence as to the location of enemy positions would certainly allow for a degree of preparation, the mobility of most modern weapons systems can result in outdating even the most recent intelligence.

Survivability in Air Cavalry Tactics

Air cavalry units perform reconnaissance, security and economy of force operations using the general doctrine established for ground cavalry, but with some distinct differences. Current Army strategy includes employing air cavalry to rapidly reconnoiter and maintain surveillance over wide areas of the battlefield and to respond to and rapidly exploit changing battlefield situations. In a typical air cavalry operation, the NTSH would be employed to conduct reconnaissance and locate targets while accompanying attack helicopters through gaps created in the enemy's front by U.S. armor assaults. In that scenario, the NTSH and its attack helicopter team would operate on the flanks of the penetration and into areas where the enemy is expected to have been fragmented by the armor assault. The air cavalry element would continue to reconnoiter along the perimeter of the penetration looking for possible counterattacking enemy forces and, if located, would participate in an attack against them.

The NTSH would be less able to survive in the air cavalry role than it would while working with an attack helicopter unit in the vicinity of Zone I. The deeper the air cavalry element penetrates previously held enemy territory, the more likely would be a chance encounter with a Soviet HIND-E attack helicopter or any number of other weapons capable of damage or destruction. If the concept of utilizing the MMS to provide survivability in and around Zone I is questionable, the NTSH would have an even

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shorter life span if employed as part of a reconnaisance/counter-attacking force deep behind enemy lines.

Benefit of NTSH in Artillery--
COPPERHEAD Mission is Limited

The Army plans to deploy 29 percent (208) of its planned NTSH's as Field Artillery Aerial Observers (FAAO) to conduct reconnaissance, request and adjust indirect artillery fire and, most importantly, to laser designate targets for the laser seeking COPPERHEAD round. Because the COPPERHEAD round is not scheduled for deployment until April 1982, little is known about exactly how effective it will be, especially against moving targets on a modern battlefield.

The NTSH has a limited capability of determining target location with enough precision to direct a COPPERHEAD round to a point within the required target area. Besides the range limitations of MMS as previously described, atmospheric and battlefield conditions could degrade the ability of the COPPERHEAD's laser seeker to acquire the laser spot projected on the target by the NTSH and to make necessary in-course flight corrections.

The survivability of the NTSH in the FAAO role is severely jeopardized by the disparity between the maximum range of the COPPERHEAD round and the shorter range of the NTSH's laser designator.

Survivability of NTSH Attributed to MMS
is Marginal Because of Sight Range Limitations
as Well as Ill-Defined and Obsolete Tactics

The Army justifies the NTSH program on the grounds that it will be able to perform more efficiently and with a greater chance of survivability than the present scout helicopter. In support of the NTSH, Army studies indicate that the MMS will reduce its detectability by 30-60 percent as compared with the current OH-58C. Other studies indicate that the NTSH will solve the deficiencies that the Army attributes to the current scout helicopter.

It is obvious that the new power train in the NTSH will allow for improved NOE flight characteristics, however. The NTSH appears to have fallen short of remedying the single most obvious deficiency in the current scout--target acquisition and laser designation from a standoff distance beyond exposure to enemy anti-air defenses.

The MMS concept is to provide an increase in the survivability of NTSH while it is performing its mission as a laser designating targeting platform for attack helicopters and field artillery units. The MMS is designed to allow the NTSH to perform its target acquistion and laser designation functions while the NTSH is concealed behind terrain features. However, the limited range of the MMS, combined with Army tactics, contribute to a contrary attitude of vulnerability for the NTSH.

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The performance capabilities of the OH-58 as well as its proposed modification, the NTSH, reflect the needs established for a scout helicopter by military doctrine prevailing at the time of its initial design in the 1960's. At that time, the Army required a helicopter capable of fulfilling the scout role in a guerrilla war where the threat of sophisticated anti-air weapons was not a major source of concern. The threat is decidely more sophisticated in the 1980's and 1990's. When questioned about the survivability of the NTSH working with the AH-64 in a modern high threat environment, Army officials said that "it's more cost effective to lose a scout than an attack helicopter."

In almost every case the Army's tactical approach addresses a Soviet threat that employs World War II tank tactics updated by modern technology. Teaming the NTSH with its MMS in front of the attack helicopter places the NTSH closer to the threat. The Defense Intelligence Agency (DIA) advised that the ZSU-23-4, a Quad 23MM Self-Propelled Radar Controlled Anti-Aircraft gun with a tactical anti-aircraft range of 2,500 meters and a maximum range of 7,000 meters (horizontal), is a primary threat. Additionally, the Soviet arsenal contains an array of Surface-to-Air Missiles (SAM) which run the gamut from the basic shoulder operated weapon to large crew served vehicle mounted systems, all of which are considered extremely accurate and reliable.

According to an Army official, it is because of the lack of survivability of the NTSH and Forward Observer (FO) in the area beyond FEBA that the Army is developing a Remotely Piloted Vehicle (RPV) to perform reconnaissance and target acquisition/ designation missions. Moreover, the NTSH does not possess sufficient ballistic hardening to allow it to sustain a direct hit, as compared to the AH-64.

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THE ARMY'S NIGHT VISION GOGGLES PROGRAM

Concerns expressed by the Committee in 1980 and again in 1981 on the need to maintain a crucial industrial capability apparently were forestalled by the Army until these same concerns were called to the personal attention of the Secretary of the Army in late 1981 by several members of Congress.

In addition, an Army assessment of second generation night vision devices revealed that the Army's capability to detect and engage the enemy at night, falls a short of that which should exist.

The second generation night vision goggle, (AN/PVS-5) is a lightweight, headmounted, binocular system with two monocular units (image intensification tubes using second generation technology) mounted in a face mask with headstraps. The goggles can be used alone or with standard helmets and provide capabilities for reading and performing manual tasks such as driving, walking, medical aid, air support and surveillance at night to the extent that security from detection is maintained yet daytime efficiency is approached. The total program through FY 1981 amounted to about $284 million (RDT&E funds of $11.7 million and Procurement funds of $272.2 million).

Development of second generation technology for the image intensification tubes made it possible to produce scopes that are smaller in size and weight than the first generation scopes. It also provided night vision capability during bright flashes, has better overall field performance and corrects deficiencies found in troop testing of first generation scopes. The advances made in reducing the size and weight made it feasible to incorporate the intensification tubes into a goggle configuration.

In October 1974 a required operational capability was approved to proceed with the development of third generation technology to provide a capability for Army aircraft to conduct normal missions to include contour, low level and nap-of-the earth flight at night and during periods of reduced visibility. This is the Aviator's Night Vision Imaging System (ANVIS) AN/AVS-6 which will be provided for flight crew members. Program estimates through FY 1986 include RDT&E funds of $18.5 million and Procurement funds of $167.9 million for 7,521 goggles.

A parallel effort is also underway to develop and produce a low cost night vision aid (LCNVA) AN/PVS-7 which is intended to supplement or replace the AN/PVS-5 in all operational modes. Program estimates through FY 1986 include RDT&E funds of $16.9 million and Procurement funds of $101.9 million for 18,360 goggles.

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Potential Production Gap

In 1975, following several years of development effort, a procurement program was initiated to provide the U.S. Army with second generation image intensification night vision goggles (AN/PVS-5). The program began with a buy of 98 goggles in FY 1975; 1,000 goggles in FY 1976; 3,600 goggles in FY 1977; and 5,400 goggles in FY 1978. The Five Year Defense Plan (FYDP) dated January 1978 reflected future procurements as follows:

FY 1979	FY 1980	FY 1981	FY 1982	FY 1983
6,305	6,275	6,273	4,635	5,236

In May 1978 the FY 1980-84 Procurement Objective Memorandum (POM) showed reduced quantities for each succeeding year, as shown below:

FY 1980	FY 1981	FY 1982	FY 1983	FY 1984
3,711	3,560	2,880	3,059	2,467

In November 1978 the FY 1980 quantity was further reduced to 2,901.

The approved POM for FY 1981-85 showed the same quantities for FY 1981, 1982, and 1983 as reflected above for the FY 1980-84 POM but no quantities for FY 1984 and 1985.

The FY 1982-86 POM showed no quantities for AN/PVS-5. Due to dollar restrictions and other priorities, the FY 1982 and FY 1983 programs were not funded. Thus, the last quantity was for 3,560 goggles in the FY 1981 budget. Later, this quantity was increased to 6,560 goggles by Congressional direction.

While these reductions were taking place in the Army's budget plans, the Army's authorized acquisition objective was going in the opposite direction as shown:

FY 1979 ----------	47,716
FY 1980 ----------	79,138
FY 1981 ----------	153,940
FY 1982 ----------	151,658
FY 1983 ----------	56,618

The increase in the AAO to 79,138 occurred when reserve forces were added to the initial issue quantity (IIQ).

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The second substantial change occurred when the war reserve (WR) was increased. Formerly, losses for night vision goggles for the first 180 days of combat were based on experience in WW II and Korea, and were grossly inaccurate for new technology equipment. This increased the AAO to 153,940.

The last major change on the AN/PVS-5 occurred when the Army began to project the procurement of the third generation night vision goggles (AN/PVS-7) as a supplement to the AN/PVS-5. This required an adjustment in the AAO downward for the AN/PVS-5 from 151,658 to 56,618 and the establishment of an IIQ for the AN/PVS-7 of 90,718. Together, these total 147,336 and nearly equal the previous AAO. The AAO for the AN/PVS-7 has not been firmly established since the maintenance float (MF) and WR figures have not yet been computed.

Current Army planning is to retain the AN/PVS-5 as a contingency item once the AN/PVS-7 is type classified "standard." This change in type classification will permit shifting the AN/PVS-5's to the reserve components as they are replaced in the active Army by the AN/PVS-7.

During the period January to April 1979, the Army made the decision to terminate the procurement of second generation goggles with the FY 1981 buy. The decision was based on the expectation that deliveries through FY 1981 would provide sufficient quantities to meet the requirements of the funded force package which includes all active Army units overseas and in the United States (including RDF), and to provide funds for higher priority hardware needs. Also, the Army was developing a third generation technology for use in the Aviator's Night Vision Imaging System (ANVIS) (AN/AVS-6) and the low cost night vision aid (LCNVA) (AN/PVS-7). The ANVIS was scheduled for production in the FY 1981-82 time frame and the LCNVA, which at a minimum would provide an equal capability at a lower cost, was scheduled for production in FY 1983.

According to the Army the potential performance increases expected from the third generation goggles, the AN/PVS-7, have been sacrificed to some extent in an effort to make them affordable for wide distribution in the field. In fact, one of the major advantages of the AN/PVS-7 appears to be in the area of life cycle costs due to the use of only one image intensification tube, as compared with the use of two tubes in the AN/PVS-5, and which is expected to last 3.5 times as long as the second generation tubes. The AN/PVS-7 is expected to cost 30 percent less than the AN/PVS-5, based on a production run of 66,000 units.

While the intent of the decision was laudable, it was extremely optimistic, and did not provide for a gradual phase-out of production of second generation goggles while production of the third generation was being phased-in. The decision was made in early 1979, 3 years before initial production was scheduled to begin on the third generation, and thus made no allowance in the time

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schedule for a potential slippage in the technology being developed for the third generation goggles.

In April, 1979 the Night Vision and Electro-Optical Laboratory, whose mission includes the development and initial production procurement of night vision devices, advised the Department of the Army of its concerns namely:

(1) If the procurement quantities remain small only one source can be maintained, resulting in a lack of competition for future buys. If the second generation folds as abruptly as is being contemplated, only one or two companies will stay in business.

(2) Procurement quantities are being reduced at the same time the acquisition objective is being increased.

(3) These actions will seriously affect the readiness posture of the Army. For these reasons the Army should consider programming at a level of at least 6,000 goggles a year and phasing in the third generation low cost devices as soon as ready for production, but without a break in second generation production.

(4) The Army may be heading for a repeat of history by ignoring the lessons learned from past experience.

Throughout the period 1975 to 1979, approximately $10 million of Army funds were used to provide producers with facilities, special tools and test equipment because at the outset industry would not invest their own funds. The second generation goggles initially were scheduled for production in FY 1971. Due to technical problems, production did not begin until FY 1975. This fact explains industry's reluctance to invest in the second generation program without Government support. Subsequently, an estimated $18 million was invested by industry in plant, facilities, and test equipment. Currently, three companies are in the production of night vision goggles.

Congressional Concern

Several Congressmen met with Army representatives early in 1980 to review the background of decisions relative to procurement of night vision goggles. They concluded that the Army responses to their concerns clearly revealed that the Army was willing to accept the risk associated with probable dispersal of the production base and also highlighted the Army's confidence that the third generation low cost night vision aid (LCNVA) will be ready for production in FY 1983. (Currently, the Army estimates the LCNVA will be ready for production in March 1984.)

The Army stated that the rationale for the decisions was to effect cost savings by not meeting lower priority requirements with the higher cost AN/PVS-5. It conceded that a warm production

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base cannot be maintained with a production gap and that those contractors who are not willing to layaway facilities are expected to shut down or divert their production facilities, except for tooling up for production of the third generation Aviator's Night Vision Imaging System (ANVIS).

The Army also stated that the critical high risk component for ANVIS, the third generation image intensifier tube, was to complete engineering development in FY 1981 and enter production in FY 1982. Currently, the award date for ANVIS production is estimated for August 1982, but this date is contingent on approval of the determinations and findings--the authority to proceed with award of the production contracts.

On July 1, 1980, industry representatives presented testimony on the Army's night vision program before the Defense Subcommittee of the House Committee on Appropriations. They stated that the use by Army planners of overly optimistic development schedules regarding cost and availability of the third generation night vision equipment and disregard for combat requirements have resulted in the premature curtailment of the second generation production that will precipitate a disasterous production gap and destroy the U.S. night vision technology base.

Industry representatives concluded that funds must be reprogrammed to meet the original procurement schedules set in 1979. They proposed the reprogramming of $18 million within the FY 1981 night vision budget specifically for the procurement of additional AN/PVS-5 night vision goggles; the restoration of $90 million to the FY 1982 procurement plan specifically for the procurement of second generation image intensified night vision devices; and the reprogramming of $100 million for the FY 1983 procurement of second generation devices as set out in the January 1979 plan. The out-years through FY 1985 will accommodate the emergence of third generation technology as a production item.

In House Report 96-1317 on Department of Defense Appropriation Bill, 1981, Second Session, 96th Congress, dated September 11, 1980, the House Committee on Appropriations recommended an increase of $18 million for the procurement of about 3,000 additional current generation goggles to the Army budget figure of $26.9 million for 3,560 night vision goggles. This addition was to maintain three current producers through FY 1982 in recognition of the fact that the Army had scaled down its procurement of the current goggles in anticipation of its third generation devices currently in development, and it is necessary to preserve and maintain a crucial industrial capability.

In House Report 97-333 on Department of Defense Appropriation Bill, 1982, First Session, 97th Congress, dated November 16, 1981, the House Committee on Appropriations stated its concern that the Army has revised its night vision programs and has not placed a sufficient priority on these programs to provide enough funding

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in FY 1983 and FY 1984 programs to maintain the industrial base. The key vendors are few in number and their technology, in some cases, is unique in the free world. The Committee told the Army that maintaining the industrial base in this crucial high technology area is vital to improved readiness and the country's ability to fight a conventional war. Thus, the means of production must be maintained.

During November 1981, the Army received additional inquiries from several Congressmen who expressed concern that the Army's decisions may jeopardize the industrial base by achieving short-term savings but ultimately may result in a serious long-term loss of a unique segment of the technology base.

Army Action

As a result of these Congressional inquiries, the Office of the Secretary of the Army conducted an indepth review of the production base for night vision devices. The review revealed a potential production gap between requirements presently under contract for the AN/PVS-5 and the initial production planned for the third generation night vision devices. Production of the second generation AN/PVS-5 goggles will end during the second quarter of FY 1983. The current budget will allow low rate production of the third generation AN/AVS-6 aviator goggles to begin in 1983. Later in 1984, low-rate production is planned to begin on the third generation AN/PVS-7 troop goggles. Thus, a production gap will result until the industry reaches sustained production rates on the third generation goggles.

The Army has taken action to include within the FY 1983 budget request a line for 2,700 AN/PVS-5 goggles at an estimated cost of $16 million, and to include in planning documents $11 million for 1,800 AN/PVS-5 goggles in FY 1984 and $4.5 million for 750 units in FY 1985.

These requirements will be competitively solicited among the three current producers in expectation of making two multi-year contract awards.

Additionally, the current producers will be asked to stretch out the deliveries for undelivered requirements presently under the FY 1981 contracts from about 350 units a month to about 150 a month. This means that deliveries that would have been completed in March 1983 will now be completed in March 1984. The impact on price, if any, can only be determined after negotiations with the prime contractors on the stretch out have been concluded. Industry sources have indicated that undoubtedly prices will increase.

The Army also plans to exercise its options under the FY 1981 contracts by adding 1,316 goggles to satisfy funded Navy, Marine Corps, and Air Force requirements, 552 goggles funded under foreign military sales agreements, and 1,078 18mm spare tubes for the Army. These actions which must be concluded before the

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expiration of the option clause on April 30, 1982, are expected to avoid a production gap and allow the three current producers to extend the production of night vision devices at a sustaining rate while the multiyear contracts are in the process of negotiation. The Army expects an award date in October or November 1982 for these contracts assuming that the FY 1983 Defense budget is approved by that time. Since the Army had not funded any procurements in the FY 1982 budget, no new starts could begin under a continuing resolution.

Use of two multiyear contracts competed among the three current producers should result in lower prices for the total quantity than the price that could be expected from either the award of multiyear contracts to each of the three current producers or award of annual contracts to each of the present producers for each of the three fiscal year requirements. However, the competition for two awards between the three current producers means that one will be dropped from the program. This result is not consistent with the intent of the Committee's language in the 1981 Department of Defense Appropriation Bill which added $18 million to maintain the three current producers through FY 1982.

Assessment Report

As part of the Army's quality assurance function carried out by the Materiel Development and Readiness Command, an assessment was made of Second Generation Night Vision Devices which were initially fielded during 1977 and 1978. The field portion of the assessment effort was conducted in Germany during November 1980. The report was concluded in January 1981.

The report conclusions, as stated by the Electronics Research and Development Command that directed the study, revealed that the Army's capability, particularly in U.S. Army, Europe, to detect and engage the enemy at night, falls far short of that which should exist. The shortfall did not result from poor equipment performance or design, but from:

A serious misallocation of assets.

An inability of high priority aviation units to utilize the night vision goggles.

A shortage of batteries in using units.

An apparent lack of emphasis on training.

A lack of personal contact with user or maintenance units.

The Command concluded that while the problems are serious, they are totally within the Army's power to correct and that with

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major command emphasis, all problems can be rectified within 12 months.

Misallocation of Assets

The misallocation of assets resulted from a lack of clear guidance from headquarters. In March 1981, the Army directed that all future distribution should follow the Materiel Preparedness List sequence and that there would be no redistribution of assets at this time. From the fourth quarter of FY 1980 to the fourth quarter of 1981, there was an increase of 6,094 goggles to the U.S. Forces in Europe. (From 3,329 to 9,423.)

An Inability of High Priority Aviation Units to Utilize the Night Vision Goggles

Recognizing that the hours available for night training are set by the host country and are not readily changed, the Army recently distributed da light training filters which should alleviate this restriction. Also, the Troop Support and Aviation Materiel Readiness Command and the Aviation Research and Development Command are working together on making aircraft cockpit lighting compatible with night vision goggles.

A Shortage of Batteries in Using Units

It was concluded by the Army after a detailed review that the lack of batteries in using units was apparently due to problems at the user level, i.e., requisitions were not submitted or were filled out improperly. The wholesale supply system appears to be functioning satisfactorily. Field supply and maintenance technicians have been directed to coordinate with the users and resolve their problems.

An Apparent Lack of Emphasis on Training and a Lack of Personal Contact with User or Maintenance Units

The Training and Doctrine Command and the U.S. Army, Europe were provided copies of the assessment report for appropriate action on training. In addition, several night vision experts have been assigned to U.S. Army, Europe, for a year to provide technical advice, increase emphasis on operational training and usage, to work with the field maintenance and supply technicians, and to interact with user and maintenance units.

The Army is considering a follow-up assessment that would include other Army users of night vision equipment as well as U.S. Army, Europe.

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CONVENTIONAL AMMUNITION PROGRAMS

An analysis of peacetime programs suggests that training ammunition consumption is inadequately managed and not sufficiently documented in procurement budgets.

The financing for conventional ammunition, its procurement, distribution, and consumption enlist complex and expensive processes which have attracted repeated scrutiny by Congress. Much of the interest is generated during annual budget reviews and is consummated by an annual GAO assessment of budget proposals for procurement of specific ammunition items.

By Committee directive, reports on ammunition programs have been issued at intervals by the Investigative Staff. One such report was completed in 1980 on the principal functions associated with ammunition requirements, procurements, distribution, transportation, and storage. Within provisions of the Committee directive on procurement practices of the Department of Defense, dated February 2, 1981, the Investigative Staff has undertaken an update of its previous inquiry. At this juncture the effort mainly concerns Army and Air Force programs. The inquiry is expected to continue beyond the information presented below.

Ammunition Procurement Budgets

In the past, DOD and the military services, because of reprogramming actions, have been accused of using ammunition procurement budgets as a bank account to satisfy other program interests. Substantial reprogrammings have occurred in periods where the services have complained that insufficient funding prohibited compliance with DOD stockpile guidance.

An analysis of FY 1979 and 1980 Army and Air Force budget actions verify substantial reductions through reprogrammings. Air Force reprogrammings approximated $37 million over the 2 years, and Army $157 million. During this same period the lack of financing led Army to aprocurement strategy limiting ammunition buys to the European theater rather than attempt to meet DOD worldwide stockage guidance.

In FY 1981 there were no reductions in Army and Air Force budgets through reprogrammings, which according to Army and Air Force representatives is an indication of the services intent to comply with Congressional concerns on reprogrammings.

Increases in Army and Air Force FY 1982 ammunition procurement budgets suggest a concerted effort by DOD and the military services to procure war reserve ammunition at stockpile guidance levels. The Army's FY 1982 budget as reported in March 1981 amounts to $2.138

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billion, an increase of 75 percent over FY 1981 and 166 percent over FY 1980. Included in the FY 1982 budget is approximately $900 million for training ammunition.

The Air Force budget for munitions and associated equipment, commonly referred to as the "3080 account" for conventional ammunition, amounted to $1.123 billion in FY 1982, an increase of 226 percent over FY 1981 and 250 percent over FY 1980. Approximately $317 million of the FY 1982 funds were designated for training ammunition.

Army and Air Force budget documents provide only limited information on ammunition procured for peacetime consumption. Generally only training unique items are identifiable, whereas considerable quantities of combat ammunition is consumed. A better understanding of ammunition programs would be conveyed if ammunition budgets identified all amounts for peacetime consumption.

Basis for Ammunition Procurement

The DOD annually issues guidance which among other things establishes parameters for procuring conventional ammunition. Guidance issued in May 1981, addresses the FY 1983/87 Five Year Defense Plan (FYDP), and does not substantially change former goals. National security and defense objectives, worldwide priorities, and military strategy continue to stress U.S., NATO, and Northeast Asia (Korea) defenses, and the need to field a Rapid Deployment Joint Task Force. These authorities are basically the same as provided by former DOD guidance, but does not necessarily reflect a status quo.

In recent years DOD guidance objectives for ammunition procurements have not been sustained by the services because of an unwillingness or inability to fund within total budget authorizations. The Army and Air Force FY 1982 budgets for ammunition plus supplementals, and the FY 1983 budget proposals are now at a level judged sufficient to meet the present guidance. Any substantial reductions or reprogrammings, and failure to maintain this same level throughout the FYDP would alter the achievement.

The May 1981 DOD guidance document, in reference to operation of the ammunition production base, does not offer an increase in the production surge capability sought by advocates. This has been attested to by DOD and Army managers. A new document, presently in draft format which specifically addresses the industrial base is said to provide for a surge capability in new facilities, and to offer direction for long range planning.

Without significant change to national security and defense objectives as portrayed in the May 1981 guidance, no change should be expected in DOD ammunition procurement strategy in the short term. However, any substantial improvement by the services in attaining minimum stockage levels could precipitate an inclination to build to a full objective. This is based on DOD guidance which

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noted that the United States cannot rely on a conflict being a "short war."

Ammunition Requirements

Although DOD guidance establishes parameters for war reserve stockage levels, the military services have the latitude to develop the quantity and type of ammunition needed to meet a defined threat. The military services also develop requirements for peacetime consumption of ammunition which is virtually ignored in DOD guidance. The various Army and Air Force programs for requirements forecasting and applications are discussed below.

War Reserve Requirements

The Army and Air Force use computer modeling to predict wartime consumption of conventional ammunition. The results of the scenario oriented exercises are used to forecast short and long-term war reserve requirements up to 180 days. In the past, Army and Air Force have been criticized for duplicating the number of kills scored by each, resulting in inflated requirements. Representatives of both services now claim that close coordination by planners have eliminated duplications. Both services also report continued effort to refine methodology resulting in greater overall accuracy in predicting requirements.

Army

The Army's continued use of separate P rates for procurement of ammunition and D rates for distribution remain confusing. While both rates conform to a theaterwide NATO scenario, P rates attempt to predict the ammunition needed in the long term for use in developing procurement leadtime and D rates serve to provide distribution guidance for ammunition assets on hand.

P-86 rates are now in use and correspond to the last year of the FY 1982-86 FYDP. However, D-77 rates computed in 1976 became obsolete before the introduction of D-82 rates this year.

D rates are sometimes viewed by Army field commanders as arbitrary and unsuitable for planning unit size engagements. The Army has not intended D rates be used for this purpose, but rather to serve as guidelines for theater-wide distribution. While major commands are not called upon to participate in the development of D rates, they formulate annual ammunition call forward programs for Europe and Korea. These annual exercises should provide major commands an opportunity to plan ammunition needs for near-term strategies without complete reliance on previously formulated D rates.

The Army has eight different war reserve stockpiles of ammunition to support worldwide contingencies.

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Air Force

The Air Force in developing procurement and distribution strategies annually call upon major command input for projecting targets, defenses, and delivery tactics. If these inputs are judiciously applied, as the Air Force contends, theater war reserves should be consistently and proportionately balanced with force structure and delivery platforms.

The Air Force has estimated its present European stockpile of ground to air, and air to air munitions capable of providing 19 days fighting, with days of sustainability dependent upon the extent of engagements.

Peacetime Requirements

The Army and Air Force collect and forecast data on peacetime ammunition consumption in various categories of use. For both services, training use by far exceeds other categories and is second to war reserves in procurement. Both services attempt to predict training requirements, but they admit having done a poor job. They trace their deficiencies to complacency brought about by a surplus of old ammunition made available for training in periods following World War II, Korea, and the Vietnam conflict. These times have now passed, and Army and Air Force are called upon to procure war reserve items and training unique items for training use.

It is difficult to comprehend the Army and Air Force dilemma in developing credible ammunition training requirements since the services' main function in peacetime is training.

Army Peacetime Programs for Ammunition

Training

Army ammunition training requirements are developed at unit level on the premise that unit commanders are better able to judge unit training needs. Unit requirements are coordinated at division level, finalized at major command level, and annually validated by a Training Ammunition Authorization Committee (TAAC). The TAAC forecast is then assimilated into the total ammunition procurement authorization.

Due to procurement leadtime, which for some types of ammunition may exceed 12 months, there is no relative comparison between ammunition procurement and consumption in the same year. However, actual training consumption is comparable with forecasted consumption. This is the thesis of a DOD program budget decision affecting the 5 year Army ammunition forecast for FY 1983-1987. DOD contends that the Army has historically over projected training requirements by 30 percent, and are therefore subject to reduction.

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DOD reduced the Army's FY 1983-1987 projected training procurements by 15 percent across the board. Also, DOD added the caveat that further reductions would be considered if training predictions do not improve.

In a follow-up effort on the DOD assessment it was determined that Army training expenditures for three fiscal years, 1979, 1980 and 1981, averaged 31 percent less than authorized by TAAC. The figures are as follows:

Year	Authorized (dollars in millions)	Expended	Percent Expended
FY 1979	$503.3	$375.0	74.5%
FY 1980	549.2	366.0	66.6
FY 1981	525.2	349.8	66.6

The above expenditures include totals from five major commands and the Army National Guard. The ammunition training requirement predictions of the Army Training and Doctrine Command were the most deficient, reflecting a 61.6 percent, 67.0 percent, and 61.8 percent accuracy for each of the 3 years.

It must be recognized that the above statistical data is not conclusive when considering the logistical problems associated with acquisition and consumption of the variety of ammunition items used by the Army for training i.e., production, transportation, storage, etc. An analysis of this nature is being attempted by Army's Training Directorate. While no conclusions have been reached, FY 1981 training consumption data suggests that many items projected for use were not used, others only partially used, and some consumed in excess of predictions. Although this information is the result of a preliminary analysis of raw data it is indicative of training ammunition mismanagement, and suggests Army's ammunition budget is overstated.

The Army's difficulty in predicting ammunition training requirements was a concern expressed by the Army Inspector General (IG) in his report on Conventional Ammunition Special Review. The report concluded that development of training ammunition requirements lacked standardized procedures, was subjective, and was not sufficiently related to readiness.

Testing

A cursory inquiry was made into the use of stockpiled ammunition in tests. The Army has provided only limited statistical data on the matter but the IG in his report estimated that 10 percent of ammunition procurement is consumed through test and evaluation. The IG

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report was highly critical of Army's failure to maintain adequate records on this activity which preclude determination of costs. The report also criticized inadequate controls which lead to draw down of critical war reserve stocks through testing.

One Army spokesman advised that the IG concerns dealt with a period between 1977 and 1979 when virtually no records were kept by ammunition inventory managers of consumption through tests. He claims the situation has been rectified, but his estimate of a $25 million annual cost for testing is considerably below that estimated by the IG. As an example, Army FY 1980 and FY 1981 ammunition procurement budgets of $803.4 million and $1.22 billion could include projected testing expenditures of as much as $80 million and $120 million, respectively.

Air Force Peacetime Programs for Ammunition

In evaluating Air Force ammunition programs, headquarters and field functions associated with peacetime procurements in support of ammunition requirements and consumption were examined. This review has conveyed the general impression that the Air Force is diligent in day-to-day management of its programs, but lacks the wherewithal to assimilate information for total program oversight.

The Air Force method of item management tends to preclude total program comparisons for requirements and consumption and year-to-year comparisons. The absence of such information could create a conservative influence on management resulting in overbuying for purposes such as training.

Air Force efforts to develop training requirements appear to follow a logical path. Annual requirements are computed at unit, installation, and major command level under guidance of published training regulations and monitored by the Air Staff at Washington headquarters. However, user units have historically ignored requirements forecasts and drawn upon stocks in unregulated fashion. This has created excesses in some ammunition items and shortfalls in others, but most importantly it defeats intelligent procurement planning.

The Air Force claims to have tightened controls by strongly challenging training requirements item by item, and initiating accountability controls on users. The latter effort includes reprogramming of the Air Force automated data inventory system to prevent ordering of ammunition stocks excess to training forecasts. Since these are new initiatives, there is no basis for determining success, although field personnel expressed their intent to cooperate.

The Air Force was unable to provide meaningful statistical information for comparison of ammunition consumed in training with training forecasts. In the absence of such information, an

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analysis was performed of Report on Programs (P-20 reports) maintained by Air Force ammunition item managers.

The P-20 report in effect contains a history of each ammunition item. A review of 10 items commonly used in training showed during a period of several years numerous differences existed between planned expenditures for training and actual expenditures. In many instances, the variances were great, while the percentage of use for some items was as little as 30 percent, others exceeded 150 percent. This data, however, is not construed as sufficient to prove or disprove excess procurements of training ammunition by the Air Force. It does, however, confirm that training forecasts are not very accurate.

The Air Force does not routinely develop annual ammunition consumption figures by program element, thus this historical information was unavailable for analysis. The Air Force was able to compile FY 1981 data from field submissions which showed that ammunition valued at $100.6 million was consumed during the fiscal year. Within this amount $88.4 million was used for training, $3.2 million for testing, $5.3 million set aside for demolition, and $3.7 million consumed for other purposes. Within these figures war reserve target destruct munitions amount to about 18 percent of the total dollars, but only 1.3 percent of total items consumed.

The above figures representing a single fiscal year are insufficient to establish trends, but it is quite obvious that training is the predominate consumer of peacetime ammunition. Also, based on the 1.3 percent consumption figure, critical war reserve items appear judiciously controlled.

The amount of ammunition consumed in testing by the Air Force during FY 1981 appears nominal at 3 percent in comparison to the alleged 10 percent consumed by the Army. It was learned that the Air Force does attempt to forecast testing requirements, much in the same manner as training, but there is no data for comparison between forecasts and consumption.

Care and Maintenance of Ammunition

General Accounting Office (GAO) Review

The military services have varying significant problems with the care and maintenance of their existing inventory of conventional ammunition according to a current report. Problems reportedly exist because of inadequate maintenance facilities in Europe, insufficient European storage facilities, unreliable records, and insufficient funding.

The European ammunition maintenance facilities of both the Army and Air Force are not able to keep pace with the rate of deterioration. Consequently, the backlog of unservicable assets

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is increasing. New or improvement of existing maintenance facilities are planned by the services but the source of funding, NATO or Military Construction-Army, has not been determined.

The Army has a serious problem in Europe due to storage facilities which are substandard since many of the buildings were designed for purposes other than ammunition storage and other facilities have deteriorated to the point where they no longer provide adequate shelter according to the GAO. The consequence of these poor storage conditions is an acceleration of the deterioration of the ammunition and an increase in the demand on the overstrained maintenance facilities. The Army estimates it will not have adequate storage facilities until at least 1989. To a lesser extent, the Air Force also has a storage problem and has had to resort to open rather than sheltered storage at some of its European depots. Open storage has caused the ammunition to deteriorate at a faster rate than existing maintenance facilities are able to cope with.

According to GAO, unreliable records have also contributed to the problems of caring for and maintaining the current inventory of ammunition, especially Navy. The Navy does not know how much inventory it has in storage, where it is physically located, or the ammunition's actual condition. A continuing problem exists between the Navy's records of quantity, as well as condition, and the records kept by the single manager for conventional ammunition. The Army also has a problem concerning the adequacy of the recorded condition of its ammunition. The Army's estimate of the quantity of ammunition needing renovation is based on an assumption that the condition of part of the ammunition was improperly recorded as requiring minimum maintenance rather than renovation. Army officials could not provide documentary support for their assumption. The GAO has serious doubts as to the accuracy of the Army's renovation backlog and related funding needs. However, estimates are that nearly one-third of the Navy's $6.7 billion inventory is unserviceable.

Movement of Prepositioned
War Reserve to Europe

The requirement to preposition war reserve (PPWR) ammunition in Europe compounds and further aggravates the U.S. Army Europe (USAREUR) problem of substandard storage facilities.

The Army faces two physical constraints in achieving the required PPWR. One is a limitation on the amount of storage capacity and the other is a limitation on the within theater ammunition handling capabilities of USAREUR.

The planned movement of PPWR to Europe will not achieve the desired supply until approximately 1993. The Army is addressing the possibility of improvements in material handling capability and the possible addition of units in support of ammunition movements with a view towards improving the situation.

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Sufficient storage capacity is available until FY 1984 at which time additional movement is predicted upon NATO infrastrucutre funding support for construction. Additional infrastructure funding will be required to achieve sufficient storage capacity beyond FY 1984.

Potential Demiliterization and Disposal Problems

The Army presently has a backlog of excess, obsolete, and unserviceable ammunition that is accumulating annually. While there are no current storage problems in CONUS the Army is seeking ways to eliminate the buildup.

There are two general methods of disposal used by the Army, demilitarization and foreign military sales for salvage. The Army claims it can only dispose of a limited quantity annually through demilitarization due to the lack of modern facilities capable of coping with environmental constraints. Foreign military sales for salvage also has its limitations because of price, according to the Army. By law, the Army must charge 5 percent of the ammunitions acquisition cost, but potential customers are willing to offer only about 1 percent. The Army through DOD is seeking to alleviate the stringent legal constraints which would allow disposal through foreign sales.

Conventional Ammunition Special Review (CASPR)

Preceding sections of this report refer to Army Inspector General (IG) inquiries on conventional ammunition. An IG report was published in July 1980 captioned, "Conventional Ammunition Special Review (CASPR)." The Army without releasing the CASPR report, has submitted information to the Congress on progress to resolve issues of concern to the IG special review team. It is understood from Army representatives that the CASPR report, together with a status report on findings, will soon be officially released to the Committee.

Limited access to the CASPR report was recently provided during discussions with the Army Munitions Division CASPR Working Group, but at that time only statistical data was available as to the present state of resolve of IG findings and recommendations. Based on information compiled by the working group, the IG made 112 recommendations of which 53 have been "closed out," and 34 "implemented." The remaining recommendations are in various categories of review and implementation.

Limited to information provided by the CASPR working group, positive efforts appear to have been made by the Army to insure pursuit and execution of the CASPR issues, including establishment of a general officers oversight committee.

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The report was used by the Subcommittee during hearings on the FY 1983 Defense Appropriation request.

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Report of February 17, 1982

LIGHT AIRBORNE MULTI-PURPOSE SYSTEM (LAMPS) MARK (MK) III

The Navy's LAMPS MK III program has a long history of cost growth, indecisiveness, and overly-optimistic projections. The Navy's management has perpetuated this indeciveness, making it a major contributing factor to excess program costs. The planned mission profiles for the LAMPS MK III will severely cripple it as an ASW asset.

History and Description of the LAMPS Program

LAMPS-Long Time Development Program

The LAMPS program evolved from a formal requirement issued by the Chief of Naval Operations (CNO) in April 1970. The program called for the development of a manned helicopter to support and act as an extension of the Anti-Submarine Warfare (ASW) ships' weapon system.

The first stage of the program was the development of the LAMPS MK I, which was a SH-2 SEASPRITE helicopter with a limited capability avionics suite. The MK I was first introduced into the fleet in October 1971 and is still in operation.

The second stage of the program, LAMPS MK II, was planned using the same basic sensor equipment as the LAMPS MK I, but was to be deployed on a new helicopter platform. The LAMPS MK II stage was conceptually completed in 1972 but terminated during development prior to fleet introduction.

The third and current stage of the program, LAMPS MK III, is one of the Navy's latest acquisition efforts. The LAMPS MK III weapon system integrates the tactical capabilities of a surface combatant ship and a helicopter. The system has a primary mission of Anti-Submarine Warfare (ASW), a major secondary mission of Anti-Ship Surveillance and Targeting (ASST), and other secondary missions of Search And Rescue (SAR), Medical Evacuation (MEDEVAC) Communications Relay (COMM), Vertical Replenishment (VERTREP), and Naval Gunfire Support (NGFS). The LAMPS MK III is currently scheduled for deployment aboard cruisers, destroyers, and frigates. The helicopter portion of the system, which is being built by Sikorsky Aircraft Corporation (Sikorsky), is the SH-60B SEAHAWK, a derivative of the Army's UH-60A BLACK HAWK troop carrier assault helicopter.

Besides the Sikorsky SH-60B SEAHAWK helicopter, the other major elements of the LAMPS MK III weapon system include mission avionics and shipboard electronics developed by International Business Machines (IBM) and a shipboard Recovery, Assist, Secure and Traverse System (RAST) developed by DAF-INDAL, Inc. LAMPS MK III is an improvement over the LAMPS MK I with: 1) improved sensor capability;

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2) computer based data handling and analysis; 3) improved ship/air tactical integration via a secure directional data link; and 4) extended helicopter range and endurance. The ship provides sensor processing, command and control, and integrates LAMPS MK III information with information from other ship sensors, including tactical towed-array sonar. The ship will also maintain the RAST system, visual landing aids, as well as maintenance and support facilities for the aircraft. The helicopter provides a remote platform for the deployment of sonobuoys and torpedoes, independent processing of acoustic and Magnetic Anomaly Detection (MAD) sensor information, and Electronic warfare Support Measures (ESM).

In April 1974, IBM was selected as the system prime contractor/integrator for deployment of the LAMPS MK III and contracts were subsequently awarded in 1978, after full-scale development (FSD) was recommended by a Defense Systems Acquisition Review Council (DSARC). The SH-60B SEAHAWK's first flight was accomplished in December 1979. In November 1980, the LAMPS MK III system was installed on the USS McINERNEY (FFG 8), an Oliver Hazard Perry Class Guided-Missile Frigate.

The first production aircraft delivery is scheduled for October 1983 and the next LAMPS MK III-capable ship is scheduled for the spring of 1984.

Submarine Threat to U.S. Naval Forces Expanding

The LAMPS MK III was developed to counter the growing threat posed by the Soviet submarine fleet and missile-equipped surface ships. Modern technology has produced faster and quieter submarines capable of cruising thousands of miles without surfacing. Missiles have also been improved, allowing hostile ships to stand off at a greater distance, yet still have the capability of launching an attack. Future Soviet submarines and surface ships are expected to carry cruise missiles.

The Soviet submarine force currently numbers approximately 388 vessels with extensive capability for delivery of torpedoes, mines, and missiles. Each of these weapons can be armed with a nuclear warhead, dramatically increasing the submarine threat in a future war.

Multi-Mission Capability Proposed for LAMPS

The LAMPS MK III system will be deployed as a reactive system which will provide over-the-horizon capability in the prosecution of contacts generated by the deploying ship or other sensor platforms. This will provide protection for carrier task forces against subsurface threats. The purpose of the system is to extend the ship's role in ASW utilizing the SEAHAWK helicopter for redetection, localization, reclassification, and prosecution of the target.

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For the purposes of tactical ASW, the Navy divides the ocean into three areas known as Convergence Zones (CZ). CZ's are the result of the deflection of sound waves along the ocean floor. The first CZ, or the inner zone, extends to 30-35 miles from the ship and is the operational area of the current LAMPS MK I and SH-3 helicopters. The middle zone, or second CZ, extends from 35 miles out to 100 miles. This is the area of LAMPS MK III coverage. The third CZ theoretically extends out to approximately 300 miles and is covered by fixed wing aircraft and other advanced sensors such as the Tactical Towed Array Sonar (TACTAS).

The LAMPS MK III system has a major secondary mission of Anti-Ship Surveillance and Targeting (ASST). At the outset of the MK III program, this was considered to be a primary mission along with ASW. In 1978, Congress expressed concern over the total cost of the program. The Navy responded with a cost reduction of approximately $401 million, of which $41.7 million can be attributed to the degrading of the ASST role by reducing ESM sensors capability. The cost cutting did not signficantly affect the ASW role.

In performing the ASST mission, the SH-60B SEAHAWK provides a mobile, elevated platform for observing, identifying, and targeting threats beyond the parent ship's horizon.

The SH-60B SEAHAWK will perform several other secondary missions: 1) it has the ability to transfer material and personnel between ships while at sea (VERTREP); 2) it can be used to search and locate an object, ship, or downed personnel, and recover personnel by use of a rescue hoist (SAR); 3) the SEAHAWK is equipped to facilitate ambulatory or litter bound personnel for medical evacuation (MEDEVAC); 4) it will also be able to provide target data to the ship's combat system (NGFS); and 5) can relay over the horizon communications between surface units (COMM).

During OPEVAL II, the LAMPS MK III redetected and relocated sub-surface threats. The reliability of the system's ASST mission, however, fell below the test objectives, and other mission areas were not fully tested due to related equipment shortcomings.

Final operational evaluation and testing of the LAMPS MK III helicopter, mission avionics, and the shipboard systems are currently ongoing. Full results of these tests will not be published until April 1982.

Questions Exist Concerning LAMPS MK III Capability to Perform Missions

Several of the systems which are integral parts of the LAMPS MK III system experienced development problems that, to date, have not been solved. Unless these performance deficiencies are corrected, the capability of the LAMPS MK III system to perform its missions will be greatly impaired.

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The LAMPS MK III is a reactive system and, as such, depends on other systems to make the initial submarine contact. The proposed primary shipboard sensor to be used for long range detection is the Tactical Towed Array Sonar (TACTAS). The TACTAS (AN/SQR-19) sensor system has fallen behind the planned production schedule and will not be available for installation for several years. The non-availability of this particular sensor will impair LAMPS MK III capability to perform its full mission. Presently, it is planned to deploy LAMPS MK III ships without TACTAS--in fact the USS McINERNEY did not have TACTAS for LAMPS MK III testing.

The LAMPS MK III helicopter will be deployed with MK-46 torpedoes. The MK-46 torpedo is scheduled to be replaced on the LAMPS MK III by the new Advanced Light Weight Torpedo which, contrary to its name, weighs 300 pounds more than the MK-46. The current mission gross takeoff weight of the SEAHAWK is 19,997 pounds. The additional 600-pound weight of two torpedoes will increase the takeoff weight to 20,597. Although the helicopter can take off at this weight, it requires increased amounts of fuel to be burned and thereby reduces the flying and on station time of the helicopter.

The present passive sonobouys used by LAMPS MK III provide relatively high probabilities of detecting many Soviet submarines; however, some Soviet submarines such as diesel/electric submarines are, when running on batteries, quieter and more difficult to detect.

LAMPS MK III Role with Other ASW Assets

The Navy envisions LAMPS MK III as acting in concert with its other ASW assets. This is based on each asset operating within its own zone of influence. Additionally, each asset possesses its own detection and location devices, and all working together should produce an effective ASW screen. The following chart represents the contribution of these assets.

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CHARACTERISTICS OF THE NAVY'S AIR ASW ASSETS

Aircraft	P-3	S-3	SH-3	SH-2	SH-60B
Base	Land	Carrier	Carrier	Destroyer	Frigate Destroyer
Sphere of Operation	500nm	500nm	35nm	35nm	100nm
Sensors					
Radar	X	X		X	X
Sonar			X		
Sonobuoys	X	X	X	X	X
MAD	X	X	X	X	X
ESM	X	X		X	X
Acoustic Processing	X	X	SDC	SHIP (only)	SHIP/ACFT
FLIR	X	X			
Weapons					
MK-46 Torpedo	X	X	X	X	X
HARPOON	X				

Composition of the LAMPS MK III Weapon System

SH-60B Aircraft

The Navy is in reality fielding an unique helicopter contrary to the Committee's direction to use a common aircraft. The Navy's selection of the Army's UH-60A BLACK HAWK as the base aircraft for the LAMPS MK III after design of the UH-60A had been completed, resulted in an extensive redesign effort (exclusive of avionics and other mission subsystem-related efforts), costing approximately $150 million. This redesign was necessary in order to make the derivative SH-60B suitable for shipboard/maritime environment. The flyaway cost of each LAMPS MK III SH-60B is estimated to cost $14.4 million.

"Commonality Gap" Exists Between UH-60A and SH-60B

Congress intended that substantial cost benefits would accrue from Navy's selection of a common aircraft. This commonality would extend not only to production; but also to maintenance, testing, and training. This is not the case. The Navy is fielding the SH-60B as an entirely new system, despite the fact that the Army's UH-60A has been in the field for over 4 years. The Navy pointed out that there is an 80 percent commonality in major structural parts on the helicopter, but the uniqueness of certain parts required by the Navy has reduced the overall commonality to 35-40 percent. According to Navy officials, the unique features of the SH-60B necessitates the Navy establishing its own logistic support, thereby duplicating 4 previous years of effort by the Army with the UH-60A.

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Commonality Can Still be
in SH-60B Logistic Support

The Navy intends to field the SH-60B as if no support system exists for the aircraft until the Navy buys that support. This becomes extremely costly, especially when a similar system, the Army's UH-60A exists. Based on data available, there is sharp contrast between the Navy's reliability and maintenance for SH-60B than those being experienced by the Army. Even though the SH-60B's uniqueness results in an apparent different airframe, commonality can still be obtained and cost savings can be accrued with joint logistic support. Yet, the Navy has:

-- Decided that the Army's reliability data on the Army's BLACK HAWK was only 60 percent common to the Navy's SEAHAWK. The Army is presently experiencing 4.9 Mean Flight Hours Between Failures (MFHBF) with the BLACK HAWK. The manufacturer predicts a 5.0 MFHBF for the SEAHAWK. The Navy, however, has set a reliability goal of only 2.9 MFHBF, while obtaining 1.7 MFHBF during OPEVAL II.

-- Estimated a higher Direct Maintenance Man-Hour/Flight Hour (DMMH/FH) projection for the SEAHAWK than the Army is experiencing with the BLACKHAWK. According to the LAMPS, PMA, maintenance data on the Army's BLACK HAWK is only 3 percent common to the SEAHAWK. The Navy has set a goal of 1.95 DMMH/FH which is higher than the Army's current actual level of 1.6 DMMH/FH on the BLACK HAWK, a more efficient level.

-- Yet to commit itself to the Army's depot level of repair for its airframe. The Navy's plan still calls for its own organic depot level maintenance facility and capability.

-- Disregarded a history or supply support established by 4 years of usage by the Army with the BLACK HAWK. This, of course, was all contractor supported. The Navy intends to duplicate this performance. A special computer system will be established to support the SEAHAWK, encompassing the planned LAMPS facilities and contractors' plants. This is outside of the normal Navy and DOD supply system with no planned tie in to the Army's aviation inventory control point. The contractor will manage supply support on fielding of the SH-60B and will for a cost, provide logistic support personnel. It is apparent that the contractor will be paid again for the same services to the Navy, that were previously provided to the Army.

-- Plans to support the LAMPS MK III System at a level that will enable it to meet the 91 percent operational availability requirement; however, this necessitates stocking spares at extremely high levels. Additionally, today's technology has done much to offset the maintenance workload at the user level. In most instances, the offset

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is realized at the next higher level or even at the depot/ manufacturer's level. This concept requires more spare repairable components and more logistic suport throughout the life cycle of the system.

-- No plans to utilize Army training facilities for any common courses. All aircraft and engine maintenance personnel will be trained by Navy either internally or externally by the contractors, either at the contractor's plant or at new Navy training facilities.

Army and Navy Engines Differ

The Army's UH-60A BLACK HAWK and the Navy's SH-60B SEAHAWK are both powered by a front drive advanced technology GE turboshaft engine, the T-700 Series. The engine was developed by General Electric (GE) to power the Army's new generation of utility and attack helicopters.

Congress directed the Navy to utilize an existing helicopter for the LAMPS MK III program. The Navy chose the Army's UH-60A powered by the GE T-700 engines. Naval officials advised that because of different mission requirements, several improvements had to be made to the basic helicopter and engine used by the Army. The improvements to the Army engine, included a 10 percent increase in available horsepower and greatly increased corrosion protection and marinization. The increased power of the Navy's engine, T-700-401, was achieved through increased turbine inlet temperature, and an improved centrifuge impeller and dump diffuser. The Army's engine and the Navy's engine are roughly 90 percent common.

The T-700-401 engine has the capacity of 1,541 shaft horsepower at intermediate rated power, and contingency power of 1,704 shaft horsepower for 2 1/2 minutes, with one engine inoperable.

The price of the engine is currently under negotiations between GE and the Navy. The initial sales price, at this stage, will be in excess of $600,000 per engine. This price is approximately $100,000 per engine greater than the Army's engine. Some of the cost is attributable to startup cost, cost of special tooling, as well as engineering changes in the engine. The cost of the engines will be reduced over the learning curve in out-year buys.

The cost of the T-700-401 engine for the SEAHAWK can vary from the aforementioned cost for several reasons. Should the Army or Navy reduce its buy of engines, the cost of each engine will increase. There has been some interest expressed in the LAMPS MK III system by several foreign governments, and Foreign Military Sales (FMS) of the engine could decrease future costs.

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RAST System (Recovery Assist, Secure, and Traversing)

In order for the LAMPS MK III to be successful, the aircraft needs to operate throughout a significantly greater ship weather envelope than is currently possible with LAMPS MK I. This created a need for an aircraft recovery and handling system. The LAMPS MK I SH-2F helicopter which weighs 12,000 pounds is limited in operation to sea state 3 during the daytime and sea state 2 for night missions. The Navy's goal is to operate the LAMPS MK III SH-60B up to sea state 5.

The Navy states that it is extremely difficult and dangerous to traverse a 20,000 pound helicopter from hangar to deck even in calm seas without mechanical assistance. The same also applies to the LAMPS MK I, especially so as sea state rises.

According to the Navy, "The need for the RAST system for SH-60B operations aboard an FFG-7 was repeatedly demonstrated during embark testing. Without it, manual movement of a 20,000 pound helicopter between the flight deck and the hangar would have required more personnel than could have found a place to push on the airframe." Pilots who have tested the RAST with SH-60B on the USS McInerney have been extremely pleased with its performance and the confidence that it imparts when landing on an unstable platform.

The RAST was developed and procured in a cooperative effort with the Canadian Department of National Defense. The Navy is committed to buy 50 RAST systems from the manufacturer DAF INDAL, Inc. before they can breakout or seek a second source. The original cost estimate of the RAST system for shipboard installation was $480,000 for a dual track system. The current estimated cost is approximately $2.1 million for Lot 1, not including labor installation costs.

OPEVAL Showed Problems with Air Frame RAST Components

The Navy's OPEVAL testing in May and June 1981, concluded that "the RAST system demonstrated capability to launch, recover, and traverse SH-60B in intended operational environment including sea state 5 within associated wind, pitch, and roll envelope." The test results, however, did reveal several problems. The majority of these were associated with the aircraft's Recovery Assist (RA) cable, which was unreliable and had interface problems between the aircraft main probe and rapid securing device. During 66 landings there were 12 helicopter related failures: 10 uncommanded releases of the RA cable, failure of a cockpit mounted control panel, and a failure of the messenger winch motor. The OPEVAL recommended the RAST system for service use after the deficiencies are corrected.

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Navy Does Not Have Recovery System for Other Helicopters

The Navy has limited the use of the RAST to the SH-60B and the LAMPS MK III weapon system even though it will continue to operate the LAMPS MK I, SH-2F, and SH-3 helicopters to the end of this century. By limiting the RAST design development, the Navy limited the ASW operations of those ships that will still have LAMPS MK I to sea states 2 and 3. Naval officers interviewed agree that a RAST-type system for LAMPS MK I would greatly enhance its operational capabilities and insure a greater margin of safety during its operation. A recent accident occurred when high sea states prevented the securing of a SH-2F to the deck of a Frigate, resulting in the loss of an aircraft and the death of a crew member.

The Navy's plans to put the RAST system aboard the LAMPS MK III designated ships, (FFG-7's, DD-963's, DD-993's, CG-47's) either in new construction or by retrofitting, are not designed to immediately increase ASW capabilities. The present plans favor those ships with primary AAW/ASUW missions. RAST installations are funded through Ship Construction and Conversion-Navy (SCN) for new construction, or Operation and Maintenance-Navy (OMN) for retrofitting. RAST will not be included on all the DD-963's. Most CG-47's and all DD-993's ships will have their RAST systems installed by that time.

Ship Electronics

The LAMPS MK III Ship Electronics system is the suite of electronic equipments on board the surface combatant which is necessary to perform the LAMPS MK III Ship/Air Weapon System mission. It is divided into functional areas of communications, acoustics, data handling, and data display.

Avionics

The avionics suite is designed to interface with the shipboard electronics suite, via the data link. It, therefore, provides the helicopter with the capability to process and display data, enables it to localize and attack submarines, and provide ship targeting information when the helicopter is within line-of-sight of the ship. The effectiveness of line-of-sight communication is based on aircraft altitude, i.e., longer distances from the ship requires higher altitudes, which in turn increases the LAMPS MK III's vulnerability to detection. The avionics suite is functionally divided into five subsystems: (1) mission sensor, (2) navigation, (3) communications, (4) data handling/data display, and (5) weapons/ armament delivery.

The mission sensor subsystem is comprised of acoustic and nonacoustic equipment. The acoustic sensor receives sonobouy

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data from deployed sonobouys which are relayed to the ship, via the data link, for shipboard processing and to the on-board Analyzer Detecting Set (ADS) for processing and display on board the helicopter. The nonacoustic sensor provides radar surface surveillance by gathering and processing of Electronic Support Measures (ESM) data for detection and identification of low altitude airborne and/or surface targets. The Magnetic Anomaly Detector Set (MAD), detects the magnetic anomalies associated with the metal from the hulls of submerged submarines. This information provides targeting data for the ship's surface-to-surface missiles.

The navigation subsystem provides the helicopter crew with doppler radar information, true air speed, compass heading, and helicopter attitude and altitude.

The communication subsystem provides for voice communication between the helicopter and the ship, computer to computer data exchange between the helicopter and the ship, the transmission of sensor data to the ship for evaluation, as well as voice communication between helicopter crew members.

The data handling and data display subsystem provides overall tactical and equipment control for the avionics suite and the interaction between the ship and airborne systems. In addition, this subsystem also provides the air crew with multi-purpose displays of the tactical information and sensor data necessary for the assigned mission.

The weapons and armament delivery subsystem provides the capability to select and launch sonobouys, as well as launch Signal Underwater Sound (SUS) devices. It also permits the SH-60B SEAHAWK to carry, preset, arm and release the MK-46 ASW torpedoes.

Limitations of LAMPS MK III Electronic Suite

The LAMPS MK III Electronics Suite is far superior to the LAMPS MK I. However, after 8 years of designing, planning, and testing by the system prime contractor, subcontractors and the Navy, many system deficiencies still exist.

Although each LAMPS MK III ship will be configured to deploy two SH-60B helicopters, the AN/SRQ-4 (data link) can only process one down link at a time, this means only one helicopter can be controlled by the ship's captain while the other must operate in an autonomous role.

Numerous Deficiencies in ASST Electronics

The capabilities of the LAMPS MK III ESM suite used in the ASST role have been found to include many deficiencies.

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Additionally, OPEVAL II pointed out the vulnerability of LAMPS MK III in the ASST mission. One Navy officer suggested that the SH-60B will perform its ASST mission only in a "permissive environment."

SH-60B Cannot Reach
Projected Surface Threat

The SH-60B is designed to operate far from its ship's platform. Its communication at this point will be limited. By the time that LAMPS is fielded, the Soviet Navy will possess the capabilities to launch anti-ship missiles (ASM) at extreme distances. Their current trend is to deploy with long range missiles well out of the reach of the SH-60B helicopter and out of reach of current U.S. Navy surface-to-surface missiles. The range of the presently deployed HARPOON is approximately 60nm. The planned TOMAHAWK is estimated to have an extended range well beyond the SH-60B operating envelope.

Navy's Desire to Upgrade ASST Capabilities
Will Be Costly

The Navy is aware of ASST shortcomings in LAMPS MK III. The Navy has, in fact, generated a "wish list" for consideration and possible inclusion in 1984 POM's. This Pre-Planned Product Improvement (P^3I) would cost an estimated $700 million in today's dollars.

Ship Classes

LAMPS MK III Ship
Designations are Erratic

The Navy has not yet decided what ships are to receive the LAMPS MK III, despite having assured Congress that it had stabilized its shipbuilding plan. Additionally, serious questions in both technical aspects and tactical mission areas of the proposed ships have not been satisfactorily addressed and answered.

The Navy plans to place the LAMPS MK III on the Guided Missile Frigates (FFG-7 Class), Guided Missile Destroyers (DD-963 and DD-993 Classes), and the Guided Missile Cruisers (CG-47 Class). This would be accomplished by retrofitting those ships already built and incorporating LAMPS MK III on those planned for construction. The LAMPS MK III present program allows for its inclusion on new and some retrofitted ships.

It has been determined that the Program Managers-Ships (PMS) are planning for only 93 ships to be configured with the LAMPS MK III weapons system. The following chart reflects the differences between the LAMPS MK III Program Manager-Air (PMA) and the PMS's estimate of total ships to be fitted with this system.

The variances in the above chart reflect the indecisiveness and managerial disarray that is present in the LAMPS shipbuilding program. While both the LAMPS MK III PMA and Ships-PMS answer

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to the same boss eventually, CNO, it is apparent that there is little control or coordination of this component segment of the LAMPS MK III program.

FFG-7 is an Unstable Landing Platform

The FFG-7 class ship has been selected to be a primary LAMPS MK III platform. However, tests with this class ship have demonstrated it to be an unstable platform for helicopter landings in its present configuration necessitating additional modifications. Poor engineering design has resulted in the heavy hangar doors having to be operated manually, creating safety and operational deficiencies.

The mission of FFG-7 class Guided Missile Frigate is to provide self-defense for battle groups. The first two blocks of the FFG's were constructed to be able to operate with a two helicopter LAMPS MK I detachment. The USS McINERNEY (FFG-8) was retrofitted during its Post Shake-Down Availability (PSA) exercise to be the test ship for the LAMPS MK III. It was necessary to lengthen the ship 8 feet from 445 feet to 453 feet. This was accomplished at a cost of $11.8 million for the entire PSA modification, of which approximately $6.2 million was for backfitting.

Beginning with FY 1981 funds (FFG-36), the ships will be provided with fin stablizers, and configured to accept two SH-60B helicopters, the RAST, and TACTAS. These additions are estimated to increase costs $30 to $40 million per ship. While TACTAS and fin stabilizers are not part of the LAMPS MK III, they are essential complements to it. TACTAS will be the trigger of the LAMPS MK III weapon system and the addition of the fin stablizers will steady the FFG as a landing platform.

The FFG-PMS office has no plans at this time to retrofit any of the first and second block FFG's (except FFG-8). They are now planning to transfer 12 of these ships to Naval Reserve. The remaining 13 will continue operating as a LAMPS MK I platforms. It is now planned, beginning with the third block, to construct 34 more ships of FFG-7 class. However, despite the fact that their construction has not yet started, five of these ships (45, 46, 47, 48, 49) will be retrofitted with the LAMPS MK III systems using Other Procurement-Navy (OPN) and Operation and Maintenance-Navy, (OMN) monies rather than Ship Construction and Conversion-Navy, (SCN) monies, since RAST machinery cannot be delivered in time to be included during the construction phase.

The FFG-8 (USS McINERNEY) was the LAMPS MK III test ship used for the Initial Operational Test and Evaluation (OPEVAL II) conducted in May and June 1981. OPEVAL II showed that the:

> "LAMPS MK III weapon system was not fully compatible with FFG-7 class ship because of design and location of FFG-8 flight deck safety nets, coupled with excessive rolls experienced by FFG-8 in most sea-states."

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It was further noted that:

> "* * * poor sea keeping capabilities of FFG-7 class ship hinder operations in high sea states. In sea state 2 and low swell conditions, rolls of 10 to 15 degrees were experienced. In all sea states, pilots commented that ship motion exceeded that of other ships on which they had operated."

Additionally, the certified envelope for traversing the SH-60B into and out of the hangar is restricted because of the limited clearance between the main and tail rotor blades and the hangar door opening which limited normal daylight RAST/SH-60B operation. The Navy believes that the addition of fin stablizers to FFG's will correct the excessive roll problems; however, this has not been tested in operation.

OPEVAL II also identified a problem with the FFG's hangar door. The doors are hand operated and require 7.5 minutes to fully open or close. This presents a safety problem in case of fire and emergency landings as the doors should be closed during landings and takeoffs. This also increases the time to launch a mission. There is no written plan to correct the door deficiency (other ships have automatic door controls).

OPEVAL II was unable to determine the complete operability of LAMPS MK III weapon system because of lack of integration with FFG-8-Combat Direction Systems and lack of the AN/SQR 19-TACTAS with accompanying display consoles.

CG-47, Guided Missile Cruiser Should Not be a LAMPS MK III Platform

The Navy is persistent in its intentions to incorporate the LAMPS MK III weapon system in the construction of the CG-47 Class Guided Missile Cruiser despite unresolved questions concerning the additional space and weight requirement placed on the ship.

The mission of the CG-47 class cruiser is to destroy enemy aircraft missiles, submarines, and surface ships in order to prohibit the employment of such forces against U.S. forces. CG-47 class ships will normally be assigned to carrier battle groups or surface action groups. It is perceived by the Navy to be "the most capable, heavily armed, and survivable cruiser in the Navy."

Navy is not Concerned With Weight and Space Problems on CG-47's

With the complete LAMPS MK III system, the CG-47 class will weigh 9,200 tons with a maximum displacement weight of 9,700 tons. There are Navy officials who consider this weight to be critical. It becomes even more critical when the vertical launch system is added to CG-49. The Navy has, therefore, embarked on a weight reduction program with a cash incentive for the contractor to

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reduce weight. The CG-PMS office is confident that the weight problem can be worked out, but cannot estimate what the costs will be in this endeavor.

The lack of space in the CG-47 hangar when it houses two SH-60B helicopters was noted with interest. The Navy has advised the hangar meets minimum clearance requirements, that is, 12 inches between stowed helicopters and any obstruction. They expect maintenance to be accomplished while both aircraft are in the hangar to include removal and replacements of components. Routine maintenance can take place with the hangar doors closed, however, major maintenance can only be done while the hangar doors are open. While the Navy contends that hangar space is not a problem, they advised:

> "* * * but just to be sure, We plan to scale model the hangar and the airplanes to assure ourselves that in fact it will work--just good engineering practices."

LAMPS For CG-47 Will Be Costly

Presently, the PMS is planning for construction of 21 CG-47 class ships (LAMPS-PMA plans for 24). Two ships, CG-47 and 48, are already under construction. Since the RAST had not been fully developed in the LAMPS program when construction started (CG-48's keel was laid on October 19, 1981), they are being constructed to LAMPS MK I configuration. These two ships will be retrofitted to LAMPS MK III at a later date. No figures are available from the Navy as to what this retrofitting will cost. Beginning with the CG-49, the LAMPS MK III system will be included in construction. The estimated increased cost for new ship construction resulting from LAMPS MK III is between $32 and $35 million each for the RAST system and shipboard electronics. The entire cost to the program would be approximately $700 million.

CG-47's ASW Role Should Be Questioned

Since the CG-47 is constructed by the Navy to be primarily an AAW and ASUW ship, questions have been raised to the wisdom of placing the LAMPS MK III on this ship class. The Navy answer is that when operating in a Carrier Battle Group, the CG-47 class provides a defensive screen for the carriers. In this role, the CG-47 will be required to press an ASW attack if an enemy submarine penetrates the inner zone. For this reason, LAMPS MK III is needed. However, ASW experts will testify, that within the inner zone, the most effective ASW detecting device, is the active dipping sonar presently deployed aboard SH-3 helicopters which are carrier based. There are no plans to place an active dipping sonar on LAMPS MK III. Additionally, Soviet submarines may not have to penetrate the inner zone to launch a weapon.

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LAMPS - Inept Vehicle for Targeting Role

The CG-47 will also be assigned to Surface Groups whose mission is to seek out hostile surface ships. This is not an ASW mission. It is an ASUW mission which would use LAMPS as a targeting platform in conjunction with the HARPOON/TOMAHAWK missile.

Prior studies have addressed this question of using LAMPS MK III as a targeting platform for the HARPOON.

The Navy believes the LAMPS MK III can provide this support. However, the slow speed of the SH-60 helicopter along with the lack of defensive weapons makes it an expensive platform for missile guidance if placed within the lethal envelope of a surface threat. As previously pointed out, Soviet anti-ship platforms will be operating well out of the range of the HARPOON.

The Navy has not emphasized but does want the ASST mission of the LAMPS MK III on the CG-47 class.

DD-963 (SPRUANCE Class Destroyer)

The DD-963 class, Guided Missile Destroyer is the Navy's primary ASW platform. It is capable of operating independently or in company with Amphibious or Carrier Task Forces. The DD-963's present a stable platform for helicopter operations as its landing deck is 33 to 35 feet above water. Presently, the DD-963 class can operate with two LAMPS MK I helicopters (SH-2) in a single hangar.

Traversing Device is Greatest Need for DD-963

DD-963 class captains agree that takeoffs and landings are not their most serious concern during high-sea states but rather the danger involved traversing the helicopter to and from the hangar. The Investigative Staff has interviewed pilots who have landed the SH-2F in sea state 5 (including one who landed the heavier SH-3). It is an extremely dangerous operation, as the aircraft must be secured using chains for tie-down. In some cases, it was too dangerous to move the helicopter into the hangar.

There are presently 31 DD-963 class ships in service. All have been constructed for LAMPS MK I operations. The need for the LAMPS MK III is justifiable, yet unfortunately, all the DD-963 must be modified at a cost of at least $2.1 million per ship (not including labor). Extensive modifications include: (a) Cutting of the deck for the RAST tracks, (b) cutting of the deck for a landing control booth, (c) installation of RAST machinery, and (d) installation of shipboard equipment. There is also a possibility that the hangar must be enlarged, so that maintenance can be performed on two SH-60B helicopters. The DD-963 PMS has no firm plan for hangar modification.

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DD-993 Has Similar Mission to CG-47

The DD-993 is a Guided Missile Destroyer and is more closely related to the CG-47 class cruiser in its mission and size. As a consequence, it presents the same problems as the CG-47 in the shipboard deployment of LAMPS MK III.

There are presently four DD-993's. They were originally constructed for the Shah of Iran and have features different than the DD-963. It is primarily an AAW/ASUW platform with mission performance similar to the CG-47. The DD-993 PMS says that LAMPS MK III will be placed on this ship and, as a result, the PMS office has not developed cost estimates to accomplish this. The PMS also advised that if a two-helicopter detachment of SH-60B with accompanying LAMPS MK III equipment are designated for the DD-993, there will be a critical weight and space problem.

Lamps MK III-- a Costly Program

The LAMPS MK III program has experienced severe cost growth since its inception. Unfortunately, it appears the program will incur even further cost growth before it reaches fruition.

Despite Reduction Efforts, LAMPS Costs Continue to Spiral

In September 1981, the Navy estimated the total cost of the LAMPS MK III program would be $6.4 billion. This is a $1 billion (or 18 percent) increase over the $5.4 billion September 30, 1980, estimate, and a $2.8 billion (or 78 percent) increase over the September 1979 estimate of $3.6 billion. Overall, the estimated program costs have increased by the rate of 138 percent or $3.8 billion over the Navy's developmental estimate of $2.6 billion contained in the Selected Acquisiton Report (SAR) of September 1976.

Congress has continually expressed concern over the cost growth of the LAMPS MK III program and in 1978 directed the Navy to undertake a cost reduction program. The Navy responded to this directive with approximately $401 million in reduced program costs. Even with this reduction, total program costs between March 1978 and September 1981, expressed in constant 1976 dollars, increased from approximately $2.4 billion to $3.2 billion. This is an increase of 33 percent in program cost before the addition of cost due to inflation. Of this 33 percent, only 2 percent or $40.8 million in 1976 dollars, is due to an increase in total procurement. The total number of ship systems to be procured, increased from 61 to 71, including prototypes. Aircraft procurement did not change.

A cost assessment team was formed in January 1981 by the Navy because of concern over the ever increasing LAMPS MK III program costs. The assessment team's report dated May 1, 1981,

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detailed the reasons for the LAMPS MK III program cost increases between December 1979 and December 1980, as follows:

	Percent
Navy induced changes	4
Navy estimate errors	33
Contractor related	24
Economic index changes and vendor price increases	38
Other than Navy management	1
Total	100

Airframe Has Been A Major Cause of Cost Growth

Extensive cost growth has been associated with the airframe. The Navy's Cost Assessment Team in its report of May 1981 attributed these primarily to "manufacturing inefficiencies and the need for unique production tooling for the SH-60B." It was noted the manufacturer has been responsible for late deliveries of the BLACK HAWK to the Army during the previous 2 years. The additional tooling is required for major subassembly and final assembly of the SH-60B which, because of the structural differences between SEAHAWK and BLACK HAWK must be accomplished independently. This meant the establishment of a separate and unique production line.

Questions Still Remain Over Sikorsky's Production Capacity

All parties interviewed are confident that Sikorsky can meet the production requirements of the services despite its failure to do so in the past. These include the BLACK HAWK, SEAHAWK, and the NIGHT HAWK (Air Force version), plus the CH-53 for the Marines. There is, however, a question of whether or not Sikorsky can provide the necessary support in addition to production requirements. The Army has experienced a Not Mission Capable rate-Supply (NMCS) rate of 14 percent for the UH-60A with complete contractor support. Already a "Dirty Dozen" list of Non-Operational Supply (NORS) items exists, some with "get well dates" in 1985. One of these items is the on-board computer manufactured by Hamilton-Standard. This has a "get well date" of February 1983. The Navy has determined this company to be a medium risk for production, but they were not aware that Hamilton-Standard was experiencing problems with spares support which contributed to the Army's NMCS rate. Sikorsky does not feel that this or the other short supply items are a problem nor will they affect production. However, a "track record" of poor support has developed. Whether the NORS items will influence production is not known, but concern exists that these items may delay production or the ability to support the SEAHAWK. As usual, this would result in "fixes" being applied with accompanying cost increases.

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Army's Procurements Affect SEAHAWK Production

According to Sikorsky officials, the Army's fluctuating procurement plans for the BLACK HAWK has also contributed to the cost increases of the SEAHAWK. Budgetary constraints and the need for money in other Army aviation programs have caused this fluctuation. Presently, the Army production plans call for 1,107 BLACK HAWKS by 1991. The Navy plans to purchase 204 aircraft over a 4-year period commencing in 1982. The LAMPS PMA is committed to the 4-year buy, but there is a movement in DOD to extend the buy over a longer period in order to use the money for other aircraft programs. This would significantly increase production costs.

Unrealistic Escalation Rates Contribute to Cost Growth

As in the past, the escalation rates used by the Department of Defense (DOD) have been unrealistic and have caused a drastic understatement of projected program cost. The problem compounds itself when each service is called upon to explain the cost growth in their program.

The September 1981 LAMPS SAR estimate of $6.4 billion includes inflation cost of approximately $3.18 billion. This is a $.44 billion (or 16 percent) increase over the September 1980 escalation estimate. The current inflation figure is based on the annual projected inflation rates in effect at the time the September 1981 SAR was provided. The rates were:

FY 1982	FY 1983	FY 1984	FY 1985	FY 1986
8.7	7.3	6.2	5.5	5.0

SAR Understates Full Program Costs

Total program costs are and have been understated due to the fact that ship construction funds are not included, and inflation estimates are low. The September 1981 SAR total program cost of approximately $6.4 billion does not include $403.8 million for LAMPS MK III ship systems for 39 FFG-7 and CG-47 class ships. The total cost of these ship systems have increased 37 percent since the September 1980 estimate of $294 million, which according to the SAR was for new ship systems. Another $715.2 million are included in the total program cost of $6.4 billion for the backfitting of ships already in the fleet or under construction and ships funded with development funds.

Factors Affecting Future Cost Growth

There are several factors that could affect future cost growth of the LAMPS program. Changes in the Army's BLACK HAWK procurement

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plans would raise the unit cost of the Navy's SEAHAWK. The continued depressed state of Sikorsky's commercial helicopter line would cause increased overhead cost. If the LAMPS MK III system fails to meet its high reliability and availability objectives, additional helicopters and logistic support could be needed--further increasing program costs.

In addition to the aforementioned factors, the Navy already has a list of improvements that it wishes to make to the LAMPS MK III program. The total cost of these Pre-Planned Product Improvements (P^3I) will be approximately $700 million. The Navy plans to begin implementing these improvements in the mid-1980's. These improvements include upgrade state-of-the-art aircraft components and capabilities, and the employment of consulting firms to determine how the improvements will interface with the present LAMPS MK III system.

Reduction of SPC's Role
Not yet Accomplished

Because of concern for cost growth, the Navy previously attempted to reduce the SPC's role in order to cut the LAMPS MK III costs. At that time they estimated that $13.3 million could be saved if the aircraft avionics were installed by Sikorsky. They reported this savings to Congress then eventually "backtracked" by splitting the aircraft avionics installation between Sikorsky and IBM. This negated the savings.

The Navy's Cost Assessment Teams recommended a reduction of the SPC's scope in a May 1981 report. The Navy, through the Deputy Chief of Naval Operations (DCNO), testimony before the Congress assured that this action had been completed. This is not the case. The SPC's role for production is still being negotiated for the first lot buy (18 helicpters) and the Navy's goals for reduction are in those areas that should not have been delegated by the Navy originally but performed in-house.

The following represents the Navy's goals for the SPC role during the production phase.

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SPC PRODUCTION ROLE

Included for Production

-- Configuration Management of Mission Equipment interfaces
-- Training and Trainer Planning
-- ILS Planning
-- R&M Data Management
-- Full System Integration Memo
-- Full System Safety
-- Warranty of Each Delivered System

Excluded for Production

-- Configuration Management of Entire System
-- Cost Control of Associate Contractors
-- Manufacturing Testing Engineering of Associate Contractors
-- Control of GFE Contractors
-- Follow (up date) System Development
-- Reduction of Testing

According to the Navy, these reductions could result in substantial savings, but the Navy could not document the savings. It is estimated that the reduction of testing done by SPC could result in a $15 million cost reduction.

Management of the LAMPS MK III Program

In the instance of the LAMPS MK III program, the Navy's seeming inability to effectively manage, necessitated a contract with the International Business Machines Corporation, Federal Systems Division, Owego, N.Y., (IBM) to be the System Prime Contractor (SPC).

SPC's Role is Not Clear

While the Navy has contracted for an SPC, independent responsibility still remains with the major contractors for the aircraft, engine and RAST. Additionally, millions of dollars have been expended for technical service contracts that duplicate the Navy's own responsibilities and job tasks.

Moreover, each ship class contracts for its own SPC's. IBM will "package" the shipboard electronics, deliver them to dockside and "consult" with the ship's SPC's during integration.

IBM as the SPC has the responsibility for total system development, total system performance, system integration tests and weapon systems training. Its direct relationship is limited to the area of avionics with an informal relationship with the other major contractors. IBM serves as the system integrator for the helicopter,

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missions avionics and ship systems, although they actually produce only 9 percent of the equipment. Not all the equipment is to be integrated at IBM's facility. Some avionics must be placed in the aircraft at Sikorsky before it is delivered to IBM.

IBM does not yet have the facilities to accomplish their integration tasks. Planned facilities construction by IBM is estimated to cost between $9-10 million. Although IBM considers this cost to be their own investment, the Government will eventually pay a portion of the cost in overhead and cost pass throughs, (Cost Accounting Standards 414).

Navy is Supplementing Its Own Management with Consultant Contracts

In spite of the role of IBM, the Navy is also supplementing its program management with technical service contracts. In 1981, these contracts totalled $4,401,800 while in 1982, $1,961,300 is already planned with additional contracts forthcoming. Three technical support contracts for over $300,000 have been issued by the Navy, which substantially assume the control of all phases of Government Furnished Material (GFM) contracting. This is one area where the SPC's role is planned for reduction. A review of 38 statements of work from technical support contracts for FY-81 and planned FY-82 covering 13 contractors found that in each case they either duplicated or assumed the Navy's management role.

Most of these technical support contracts are sole-source level of effort type and continue from year to year. Additionally, contracts have been issued for the development of technical and cost information to be used by the Navy in their program decision stages (DSARC III) and Preplanned Products Improvement (P^3I).

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Report of February 17, 1982

ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)

The Advanced Medium Range Air-to-Air Missile has experienced substantial cost growth with further increases expected. Moreover, there is considerable concurrency between testing and production and production quantities may be considerably overstated.

Joint Service Development and Procurement

The AMRAAM program is a joint Air Force/Navy development effort to produce a follow-on to the medium range AIM-7 SPARROW air-to-air missile. The AMRAAM is intended to provide significant improvement in operational utility and combat effectiveness over the AIM-7 series missiles through increased missile velocity, a launch and maneuver capability, and the capability to attack several targets during a single intercept. The AMRAAM is planned for potential employment on the Navy's F-14 and F-18 aircraft and on the Air Force's F-15 and F-16 aircraft.

The AMRAAM requirement was established by a Joint Service Operational Requirement (JSOR) dated September 1976. Following a DSARC decision in November 1978 to approve program initiation, five contractors submitted prototype proposals. In February 1979, the Air Force awarded validation contracts to Hughes Aircraft Company, also the primary contractor for the AIM-54 PHOENIX missile, and to Raytheon, the primary contractor for the AIM-7 SPARROW and AIM-9 SIDEWINDER missiles, to develop a complete systems design approach, and to build and test prototype missiles to demonstrate the AMRAAM concept. The effort included missile test firing and demonstration of air vehicle and air vehicle subsystem functions.

The AMRAAM validation phase was completed on December 11, 1981, with the award of a FSED contract to Hughes Aircraft Company, El Segundo, California. The FSED contract includes production options for the first two AMRAAM production lots (1,040 missiles). A review of AMRAAM source selection documents showed that the Hughes proposal appeared technically superior to the Raytheon concept, was less costly for both missile production and aircraft modification costs, and involved less technical and cost risk to the Government. Air Force officials interviewed also confirmed that Hughes was a clear winner in the source selection competition.

The AMRAAM FSED phase will continue through early 1984. The Air Force plans to begin long lead production in 1984 and first missile deliveries are expected in August 1985. Initial Operational Capability (IOC) is to be achieved in 1986.

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The AMRAAM acquisition program is being managed by the Air Force Systems Command's AMRAAM Joint System Program Office, Eglin Air Force Base, Florida. The program office will manage AMRAAM development and procurement for the U.S. Government under a Memorandum of Understanding (MOU) for a family of advanced air-to-air missile systems signed in August 1980. Britain and West Germany will participate in the AMRAAM FSED with an option to either purchase, co-assemble, or co-produce AMRAAM in the future. France, a nonparticipating signatory of the MOU, will monitor AMRAAM development with an option to become a full participant in the future. The MOU also provides for development of an AMRAAM by the Europeans which may eventually be procured by the United States as a follow-on to the short range, heat seeking AIM-9 SIDEWINDER missile.

No FSED Test Data will be Available for the Scheduled DSARC II Decision

A critical decision point in the management of the AMRAAM program will be the upcoming DSARC II review and decision. Although the original AMRAAM program included a DSARC II review prior to source selection for FSED, recent DOD changes to the weapon systems acquisition process allowed the Air Force to delay the DSARC II until September 1982, 9 months into the 53-month FSED effort. Although the timing of the DSARC II milestone is in accordance with the "Carlucci initiatives," it is not properly timed to make an informed decision on the AMRAAM program. The revised weapon systems acquisition process established by the Deputy Secretary of Defense places the DSARC II review after, rather than prior to, the start of FSED. The precise timing of this milestone during the FSED period is to depend on each particular program and could, for example, be at the preliminary design review or critical design review. Under the revised process, DSARC III has been eliminated and the individual service determines if the system should enter production.

The current AMRAAM program schedule calls for a DSARC II review 9 months after the start of FSED and just after the preliminary design review. At this time little to no definitive data will be available to indicate the progress of the FSED phase. Delivery of the first FSED missile would not be for another 17 months, therefore, no test data will be available from captive carries or live launches. In addition, the AMRAAM design and development period would only be about one-third complete, and modifications to the F-16 test aircraft for AMRAAM testing would have just started and would not be complete for more than a year after the DSARC. Modifications to the F-14, F-15, and F-18 test aircraft are not scheduled to begin until long after the DSARC. Several other FSED events which would provide valuable data upon which the DSARC could base a decision would not be completed.

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Program Concurrency Assumes Added Risk and Increases the Importance of the DSARC II Decision

The increased AMRAAM cost and schedule risk caused by program concurrency further emphasizes the importance of having adequate information available for a DSARC II decision. A commitment of funds for long lead production items will be made about 1 month prior to delivery of the first FSED test vehicle and, obviously, prior to any missile launches. Further, award of the first production lot will occur after only one or two test launches have been completed.

The substantial concurrency increases the potential that deficiencies discovered during development, test, and evaluation will require changes to the production line and retrofits to missiles already produced. These design changes and retrofits can be costly and often extend the schedule. Because of this concurrency and the potential program risks, it is of paramount importance that a DSARC decision have enough design and performance data available to make a proper judgement on continued FSED without accepting undue risk. A premature decision by the DSARC could result in the Air Force trying to manage a program that may experience serious technical, cost, and schedule problems through the development phase, but after formal approval by DOD.

At that time, the DSARC will decide whether the FSED effort should be continued. If completion of FSED is approved, the Air Force, according to the new acquisition procedures, will make the AMRAAM production decision without a final DSARC review.

Program Costs

Program Costs Incomplete and Escalating

The current estimate to develop and produce the AMRAAM is $3,412.6 million (1978 dollars) and the life cycle cost estimate is $3,804.9 million (1978 dollars). Based on a procurement quantity of 20,000 missiles, the AMRAAM estimated unit cost is $171,080 (1978 dollars).

The current AMRAAM program, the life cycle cost estimates, and the FSED contract with Hughes are based on a sole-source procurement of 20,000 missiles. The Hughes contract, however, contains a leader/follower option for $9 million under which Hughes would assist a second contractor in qualifying to produce the AMRAAM missile. Once the second contractor is qualified, both contractors will compete for subsequent production lots. Each contractor will produce a portion of each production lot, with the relative share determined by price competition.

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The AMRAAM Program Office is currently preparing a cost/benefit study to determine if the potential benefits of competition will offset the expense of equipping and qualifying a second contractor. The program office intends to make a recommendation to DOD on use of the leader/follower concept, based on their cost/benefit analysis, prior to the September 1982 DSARC II review. If the program office recommends the concept, they must provide a leader/follower acquisition plan at that time, and some production funds would probably have to be shifted from the out-year budget to the early production effort to fund the second source production.

Program Cost Estimates Include Much Uncertainty

Although there is no current official estimate of total AMRAAM program costs, the best available estimate indicates that the AMRAAM program will cost significantly more than was anticipated when the program was approved. Additional costs to incorporate AMRAAM capability on fighter aircraft have not yet been defined and may not be defined when the AMRAAM reaches its final DSARC review currently scheduled for September 1982.

AMRAAM Costs

Independent cost estimates compiled for AMRAAM source selection show program costs have almost doubled since the preliminary cost estimate in the AMRAAM Decision Coordinating Paper (DCP). Program officials believe development cost increases reflected in the FSED contract will be offset by production cost savings not reflected in the Government cost estimate. Until these potential savings are verified and defined, however, the cost of the AMRAAM program will remain uncertain.

In January 1979, the preliminary Air Force estimate of AMRAAM life cycle costs was about $2,151.9 million (1978 dollars). An Air Force cost analysis prepared during the AMRAAM source selection process, however, estimated the equivalent AMRAAM life cycle cost at $3,804.9 million (1978 dollars). A breakout of the estimate for major program elements is shown below.

	Preliminary Estimate	November 1981 Source Selection Estimate	Cost Change
	millions		
Conceptual phase	$ 18.0	$ 17.9	$ -.1
Validation phase	116.5	110.2	-6.3
FSED phase	183.2	515.7	+332.5
Production phase	1,687.8	2,777.8	+1,090.0
O&S	146.4	383.3	+236.9
Total	$2,151.9	$3,804.9	+$1,653.0

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Program officials concede there has been significant cost growth to the AMRAAM development program. They stated much of this cost growth resulted from adding or defining necessary program elements that were not adequately considered in the original estimate. They attributed the remaining cost growth principally to the use of a fixed price incentive contract with contractual performance specifications in the development program. This approach increases the risk to the contractor and therefore increases the cost of the contractor's proposal.

The program office believes the increased development costs will be recouped later in the AMRAAM program and will not increase total program cost. The definition of performance specifications in the FSED contract should assure AMRAAM performance. The fixed price incentive contract places a ceiling on Government development costs, and provides cost reduction incentives to the contractor that may result in lower production costs.

The program office also believes the Air Force production cost estimate is inflated because it does not adequately consider a number of factors which they believe will reduce AMRAAM procurement costs. Among these are:

-- Cost savings from potential multiyear procurements.

-- The effects of competition from a leader/follower procurement strategy.

-- The savings resulting from the manufacturing technology program.

-- Savings resulting from contractor cost reductions under the incentive provisions of the FSED contract.

Because production costs represent about 78 percent of the life cycle cost estimate, the program office believes these production savings will significantly reduce AMRAAM life cycle costs.

It appears that the potential savings in the areas cited by the program office are limited. In order to accrue significant savings from leader/follower competitive procurement, for example, it would first be necessary to offset both the increased cost of paying Hughes to assist a follower, and the high cost of tooling, initital production and qualification for the second contractor. In addition, splitting the production buy between two contractors may significantly reduce the potential savings available from multiyear procurement.

Until the program office prepares and documents a comprehensive cost-to-complete estimate, the cost of the AMRAAM program will remain uncertain. Such an estimate will be prepared for the DSARC II review, and will be verified by an Air Force independent cost analysis and reviewed by the DOD Cost Analysis Improvement

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Group. Under the current program schedule, the DSARC review is scheduled for September 1982. Definitive AMRAAM cost estimates, therefore, should be available for the FY 1984 budget submission which will include the first installment of AMRAAM production funds.

Aircraft Modification Costs

Like AMRAAM program costs, the costs to modify fighter aircraft to carry AMRAAM are uncertain. These costs are not included in the AMRAAM program estimate because the modification programs will be managed and funded by the individual aircraft program offices. Although these costs were estimated as part of the AMRAAM source selection process, these estimates were made without defining the specific changes that would be required to incorporate AMRAAM capability. In some cases the services have not even determined how many aircraft will carry AMRAAM.

The source selection estimate for aircraft modification costs to incorporate AMRAAM capability was $381.0 million (1978 dollars) as shown below.

Cost (1978 $ in millions)	F-16	F-15	F-14	F-18	Total
Design	$ 30.9	$ 38.5	$18.9	$22.2	$110.5
Nonrecurring production	-	-	5.0	1.5	6.5
Recurring production	33.8	-	13.0	16.9	63.7
Nonrecurring retrofit	-	16.1	-	.3	16.4
Recurring retrofit	75.4	30.7	20.9	56.9	183.9
Total	$140.1	$85.3	$57.8	$97.8	$381.0

Since source selection, the aircraft contractors have begun to define and price the specific modifications that will be needed. Navy and Air Force officials advised it would be about 6 months to 1 year before the contractors' preliminary modification proposals are complete.

The cost estimates also contain major omissions and assumptions that prevent the services from providing a realistic estimate of the cost of incorporating AMRAAM on the aircraft.

Although more definitive cost data on AMRAAM incorporation should be available for the AMRAAM DSARC II decision, actual costs of AMRAAM deployment will not be known until deployment plans, particularly those of the Navy, are finalized.

Joint Service Operational Requirement

Performance requirements for AMRAAM were generated by a joint Air Force/Navy study that concentrated on the threat as it will exist in the late 1980's and beyond. The JSOR, issued as a

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result of the study, defined a number of performance requirements, including: (1) increased missile velocity, (2) a launch and maneuver capability, (3) the capability to attack several targets during a single intercept, (4) clutter rejection, (5) ability to defeat electronic countermeasures, (6) improved terminal capability, and (7) compatibility with all modern tactical fighters.

These performance characteristics are anticipated to not only provide a significant increase in kill capability over the AIM-7 SPARROW, but also enhance carrier aircraft survivability. The AMRAAM will have a good effective range in any weather conditions, and can attack targets at various altitudes. The following chart compares the more significant performance features of the AMRAAM and SPARROW missiles.

Performance Characteristic	AMRAAM	SPARROW (AIM-7M)
Weight	327 pounds	506 pounds
Length	140.7 inches	143.3 inches
Seeker	Active, inertial, home-on-jam	Semi-active
Attack mode	Multi-target(6 missiles at 6 targets)	Single target

With these performance capabilities, the AMRAAM is projected to achieve a higher probability of kill against enemy targets as compared to the SPARROW.

Performance Requirements Indefinite and Obsolete

In addition to providing a current technology follow-on to the SPARROW series, the AMRAAM missile provides performance capabilities that DOD believes are essential to maintaining air superiority in the future.

DOD believes that the SPARROW imposes unacceptable aircrew workload during missile employment and that significant improvements are needed.

The AMRAAM missile will provide most of these needed improvements in a smaller, current technology missile. In addition to multiple shot capability, active terminal guidance, and increased velocity, the AMRAAM provides growth capability not available in the AIM-7 missile. The AMRAAM is also designed to be an "all-up-round" which is intended to reduce maintenance requirements and support costs.

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U.S. forces are expected to be outnumbered in most large scale air-to-air engagements. Air Force employment concepts, therefore, place great emphasis on the ability to fire radar guided missiles from outside the range of potential enemy missiles.

Several Air Force officials contacted indicated the requirement for a longer range AMRAAM has not been documented possibly because the Air Force fears it might delay the start of the AMRAAM program.

These Air Force officials apparently fear that documenting a requirement for a longer range capability on the AMRAAM would result in pressure to delay approval of the program until this capability was developed. This would result in the AMRAAM being delayed past its current IOC of 1986 on the F-16 aircraft.

Follow-on to AMRAAM--
A Near Reality

Lack of a documented requirement for a longer range AMRAAM has resulted in cancellation of the ducted rocket motor technology development program which is designed to provide a longer range capability. This program, which could increase AMRAAM range was originally funded under the AMRAAM program element, but in 1979 was separated from the AMRAAM development effort. Although flight tests of the ducted rocket motor were due to start in 1984, the $14 million required for the flight test program was deleted from the FY 1983 budget by the Air Force Systems Command. If no FY 1983 funds are available, the preflight test program will be completed, and the ducted rocket motor development will be terminated.

If the ducted rocket motor flight test program is terminated, much of the $20 million invested through FY 1982 will be wasted. Air Force Propulsion Laboratory officials said the engine development program is complete, and only the flight test program is needed to determine both the capability of the engine, and the effect of a ducted rocket on the performance of an air-to-air missile. Because a ducted rocket requires forced air to operate, only flight tests can verify the projected performance. Similarly, only flight tests can determine and measure the effect of intake ducts on the flight characteristics of an air-to-air missile.

The Air Force, however, is considering restarting the effort to develop a longer range capability once the AMRAAM program is underway. AMRAAM program officials have included advanced propulsion technology in their proposed preplanned product improvement (P^3I) program. Air Force research and development officials indicated this effort would probably be a program to develop a ducted rocket motor very similar to the current model but with variable fuel flow. Air Force officials indicated the proposed engine development program would begin in 1984 and could be

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ready for production in 1991 at a cost of about $200 million. This program, however, must still be approved by the Office of the Secretary of Defense.

Aircraft Requirements for AMRAAM

Although DOD plans to deploy AMRAAM on four aircraft, the program offices for these aircraft expressed varying degrees of commitment to the program. Because of differences in air defense missions, and the capabilities of other available air-to-air missiles, AMRAAM provides varying degrees of capability enhancement to each of the four aircraft. As a result, while the Air Force believes the AMRAAM requirement is critical for the F-16, Navy officials may not deploy AMRAAM on the F-14.

Air Force Requirements

The projected performance improvements available on AMRAAM appear ideally suited to the requirements of the Air Force air defense mission. Air Force requirements are defined within the context of a full-scale ground war in Europe. The scenario requires defense of air bases and ground forces against large numbers of enemy bombers protected by fighter escorts. In this scenario, the increased range, multiple shot capability, and independent terminal guidance of the AMRAAM represent a significant performance advantage over the current AIM-7M missile.

Because of these factors, the Air Force appears solidly committed to the production and rapid deployment of the AMRAAM. Incorporation of AMRAAM provisions has already begun on F-16 production aircraft. The Air Force plans to eventually provide AMRAAM capability on most of the F-16 and F-15 aircraft.

Of the aircraft scheduled to carry AMRAAM, only the F-16 does not currently have beyond-visual-range missile capability. The Air Force feels that a beyond-visual-range missile is needed on the F-16 to make it effective in the air-to-air combat environment that will exist in the late 1980's. The F-16 will be the first aircraft to receive the AMRAAM missile, and the AMRAAM IOC is based on when the F-16 will be prepared to deploy it.

Navy Requirements for AMRAAM

While the AMRAAM provides performance improvements over the current AIM-7M missile being deployed by the Navy, the requirement for AMRAAM is less critical to the Navy mission. Although fleet defense has some characteristics in common with the Air Force mission, the Navy requires initial engagement of the enemy at much greater ranges. Because the F-14 deploys the long-range PHOENIX missile, the Navy considers the AMRAAM range improvements less important than the Air Force. As a result, the Navy is waiting for the AMRAAM to demonstrate its actual performance in 1986, before deciding how to utilize it.

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The Navy has not yet decided if it will deploy AMRAAM on the F-14. Both F-14 Program Office and Navy Air Requirements officials indicated that the Navy would not put AMRAAM on the F-14 unless operational testing demonstrated it would provide significant capability enhancement to the F-14 mission. Because the F-14 already has the long-range PHOENIX missile, the AMRAAM performance improvements over AIM-7M, which is already carried on the F-14, may not add enough capability to warrant the modifications expense. Until a decision is made to incorporate AMRAAM, the F-14 Program Office will not begin modifying F-14 aircraft for AMRAAM.

If the Navy decides to incorporate AMRAAM on the F-14, only about one-third of the aircraft will be equipped to carry it. Program officials stated that major modifications to the F-14 radar and stores management set will be made after the FY 1983 procurement. Some of these aircraft, informally designated F-14C, are planned and only these aircraft would be modified for AMRAAM.

Program officials said that while AMRAAM will be incorporated on some F-18's, it is unlikely that all the aircraft will be modified for AMRAAM. The Navy's tentative plans are to begin providing AMRAAM capabilities on F-18 aircraft in 1986. Under these plans, many aircraft would have to be retrofitted, while some could be produced with AMRAAM capability. The modified F-18 would be able to carry AMRAAM's on wing stations. Because the AMRAAM will be too heavy to be carried on F-18 wing tips, the program office is considering increasing the aircraft's capacity by adding an adapter to one station on each wing that would allow carriage of AMRAAM's on that station.

Numerical Requirements

DOD Decisions Are Required to Clearly Define AMRAAM Requirements

DOD believes the AMRAAM is critically needed as a follow-on to the AIM-7 SPARROW series missiles to provide the performance needed for air superiority after the mid-1980's. While the Air Force is committed to deploying AMRAAM, the Navy intends to wait for completion of operational testing before deciding between AMRAAM and the AIM-7M to meet their total requirement for medium range, air-to-air missiles. Because DOD is currently procuring both missiles to meet their overall requirement, some portion of these procurements will have to be cancelled to avoid exceeding requirements.

DOD is currently programming both the AMRAAM and the AIM-7M missile procurements to meet the same numerical requirement for intermediate range air-to-air missiles. If both the Air Force and the Navy do not fully deploy AMRAAM as an AIM-7M replacement, then the current projected AMRAAM procurement of 20,000 missiles (12,618 for Air Force, 7,382 for Navy) will be excessive.

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If DOD intends to replace the SPARROW, a large portion of this system's scheduled procurement will have to be cancelled.

DOD calculates specific numerical requirements for air-to-air missiles based primarily on the number of threat aircraft that are likely to be encountered in a conflict. The calculation involves projecting a particular engagement scenario, postulating critical factors such as number of friendly aircraft available, attrition rates and the probability of kill of the missiles, and determining how many missiles will be required to destroy the enemy aircraft. Requirements are projected 5 years into the future, and are recalculated annually based on updated intelligence estimates and the status of acquisition programs.

Because of the methodology used, differences in performance characteristics or reliability between two similar weapons will result in different numerical requirements.

While it appears that the AIM-7M is needed in the near term to reduce existing shortfalls, the scheduled AMRAAM buy could considerably curtail the AIM-7M program. When initially proposed, DOD intended to procure 15,000 AIM-7M's for the Air Force, and about 4,000 for the Navy. Although the Navy quantity has remained essentially unchanged, the Air Force has reduced its total projected buy in each of the last 2 years. The Air Force currently plans to buy 10,635 missiles with the last delivery in mid-1988. The Navy plans to buy 4,340 air-to-air versions of the AIM-7M with deliveries running through 1989.

Despite these reductions in AIM-7M procurement by the Air Force, further reductions will be necessary if AMRAAM is delivered as scheduled. The scheduled Air Force AIM-7M procurement represents 64 percent of its total intermediate range missile requirement. Delivery of 12,618 scheduled AMRAAM would begin in 1985, and meet the requirement in 1988 with over 8,600 missiles still to be delivered.

Similarily, planned Navy procurement of AIM-7M will fulfill most of its total requirement. If AMRAAM is deployed by the Navy, the scheduled AIM-7M procurement will probably have to be reduced by an equal number of missiles to avoid over procurement. If the Navy does not define its AMRAAM deployment plans until 1987, a major portion of the Navy requirements would be procured before the decision is made.

Any further cancellation of AIM-7M procurement will have a significant cost impact on the program. Navy officials said the current unit cost of the AIM-7M missile is $171,000 (then year dollars), based on 18,019 missiles (including 3,000 Sea Sparrow versions of the AIM-7M). Because quantity reductions would delete the later, less expensive deliveries, unit costs would increase. In addition, the Navy just spent $50 million to qualify a second production source for AIM-7M, and calculates that at

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least 14,000 missiles must be procured to break even on this investment.

Reductions in AMRAAM procurements would also impact heavily on its cost projections. AMRAAM unit costs and life cycle cost estimates are based on a total procurement of 20,000 missiles. The AMRAAM program office is also considering qualification of a second production source based on this procurement quantity. The lack of commitment to the program by the Navy, however, makes it unlikely that their share of this procurement (7,382 missiles) will be fully procured.

Program Concurrency

The DSARC II review of the AMRAAM program, which approves the system to continue FSED with the intent to enter production is scheduled for September 1982, less than 1 year after the start of FSED, before sufficient test data can be obtained, and before important cost and requirements issues are resolved. The importance of the correct timing for DSARC II, to ensure adequate information is available to make a decision, is stressed in the AMRAAM program because of the substantial concurrency between FSED and production and the resulting program risk. The AMRAAM schedule shown below illustrates this concurrency.

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Report of February 17, 1982

THE EFFECTIVENESS OF DEPARTMENT OF DEFENSE (DOD) CONTRACT PRICING PROCEDURES CAN BE IMPROVED

Policy and Procedure

DOD policies and procedures for pricing noncompetitive contracts are set forth in the Defense Acquisition Regulation (DAR). Public Law 87-653, the Truth-In-Negotiations Act and the DAR require that contractors submit cost or pricing data supporting proposed prices for noncompetitive contracts exceeding $100,000. Exempt from this rule are prices negotiated based on adequate price competition, published catalog or market prices for commercial items sold in substantial quantities to the general public, or prices set by law or regulation. DAR further requires that a cost analysis and evaluation of price proposals be performed, and that such analysis be utilized in developing a prenegotiation price objective to use at negotiations. After negotiations, a memorandum must be prepared setting forth the principal elements of the price negotiation. The Armed Services Procurement Regulation Manual for Contract Pricing (ASPM No. 1) provides supplemental guidance for DOD personnel engaged in analysis and negotiation of contract prices.

The contracting officer is responsible for determining the reasonableness of a contractor's proposed price. Procurement of new, complex, and costly products together with support equipment and services requires a high degree of competence. A team of specialists is used by the contracting officer--price analysts, cost auditors, and technical evaluators--to assist in developing a prenegotiation price objective. The contractor's proposal is usually evaluated by cost auditors from the Defense Contract Audit Agency (DCAA) and by technical personnel from the Defense Contract Administrative Service (DCAS) or one of the military service plant representative offices. Each specialist coordinates with the other members to develop their results as a team effort. The results of these analyses are submitted in an advisory report to the contracting officer.

Prior Audit Reports

GAO Report

In October 1980, the U.S. General Accounting Office (GAO) issued a report on the award of noncompetitive contracts at the U.S. Army Communications and Electronics Command (CECOM), Fort Monmouth, New Jersey. This report showed that CECOM failed to (1) obtain adequate cost and pricing data, (2) ascertain whether a subcontractor was exempt from submitting cost or pricing data, and (3) prepare adequate price negotiation memorandums.

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Army Audit Agency

In April 1981, the Army Audit Agency issued a report on the acquisition of nonstandard items by CECOM. The audit disclosed that inadequate price analyses were performed; therefore, there was no assurance that the prices paid were fair and reasonable.

The Defense Contract Audit Agency (DCAA)

The role of DCAA is to function as an advisor to the contracting officer. DCAA performs in five major audit areas--preaward, incurred costs, cost accounting standards, defective pricing, and special audits. DCAA accomplishes these tasks by reviewing contractor proposals, cost data, and overhead rates. The Investigative Staff directed its review to three of these areas.

Preaward Cost Audit Reports

An examiniation of audit reports disclosed (1) the 30-day report cycle required by the DAR to complete the audit is too short and fails to make any differential between procurement values; (2) the overhead rates used in the reports are sometimes based on outdated information; (3) contractors do not provide all the necessary supporting data; (4) often, report conclusions have to be qualified because technical evaluation reports are not received; and (5) the new DOD policy on contract audit recommendations has received mixed reactions between DCAA and contracting officers.

In May 1979, GAO issued a report on DCAA effectiveness. This report also identified most of the above noted deficiencies. Specifically, the report cited, (1) time constraints and excessive workload results in some substandard audit work, (2) information needed to conduct audits is not always made available, and (3) contracting officials do not always use DCAA findings.

The DAR specifically requires that the DCAA preaward cost audit be completed and a report issued within 30 days after the request is received. Contracting officers complained these reports are taking an average of 45 days or more. Also, the regulations fail to match the timeframe to the value of the procurement.

DCAA officials stated contractors sometimes do not provide them with the necessary supporting data, thereby reducing the effectiveness of the audit in reporting an accurate picture. In FY 1978, the amount of unsupported costs identified by DCAA was estimated to be about $3 billion. In many cases, the contractors bring in the additional support during negotiations to substantiate the unsupported cost. This ploy sometimes escapes the scrutiny of DCAA and forces the contracting officer into the unfavorable position of receiving data he is unqualified to evaluate. In the rush to award the contract, the contracting officer may not

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have the time to send the data back to DCAA for an adequate evaluation.

Contractors are refusing to give DCAA access to their computer data if a program has to be prepared. They contend that, if the data is already available piecemeal in hard copy, there is no reason why they should generate a new computer program so the required data can be assembled faster. DCAA officials believe they do not have the right to force the contractor to provide such data.

Both at CECOM and the Aviation Supply Office (ASO) instances were noted where DCAA reports included statements qualifying their conclusions because they failed to receive the technical evaluation report in time. Reports on technical evaulations are to be given to the contract auditors at least five days prior to the due date on an audit report. In such instances, the DCAA report generally states that without the technical evaluation, they were unable, by other means, to reach a definitive conclusion regarding the acceptability of certain quantitative and qualitative aspects of the proposed cost.

In August 1981, DOD issued a directive on "Policy for Follow-up on Contract Audit Recommendations." This regulation prescribes policies for management action on contract audit recommendations made by DCAA and establishes a system for follow-up. This new directive is unpopular with some contracting officers because, in their opinion, it undermines their judgments. DCAA, however, believes it should bring about better controls over the resolution of their audit findings. Also, if the award is approved by the buying command's review board, it takes the contracting officer "off the hook."

Cost Accounting Standards (CAS)

The Defense Production Act of 1950, as amended in 1970, Public Law 91-379, requires that defense contractors file statements disclosing their cost accounting practices as a condition of their Government contracts. At that time, the Cost Accounting Standards Board was established by Congress with the assigned task to promulgate the CAS to achieve conformity, consistency, and uniformity in contractor's cost accounting systems. The Cost Accounting Standards Board ceased to function as of October 1, 1980, when it was no longer funded by Congress.

As they now stand, the CAS, numbering 19, apply to all negotiated defense contracts and subcontracts in excess of $500,000 with the exception of those contracts where the price is based on an established catalog or commercial price. Exemptions are granted to small business firms, educational institutions, labor surplus area concerns, or to foreign countries.

As defined by the Cost Accounting Standards Board, a CAS is a statement that, "(1) enunicates a principle or principles

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to be followed, (2) establishes practices to be applied, or (3) specifies criteria to be employed in selecting from alternative principles and practices in estimating, accumulating and reporting costs of contracts subject to the rules of the Board."

As stated in our September 1981 report, the Investigative Staff again found DCAA reports often cite that contractors are in noncompliance with the CAS but little is being done by contracting officers to help resolve these questions. Contracting officers, when aware of CAS noncompliance, have to evaluate the amount questioned in regard to increasing production leadtimes, effect on delayed deliveries and the essential issue--fleet and troop support. However, as a means to protect the Government, special provisions are included in the contract to recover any costs affected by a CAS judicial ruling. DCAA officials believe that contracting officers could help resolve these issues by applying pressure to the contractor.

Defective Pricing

DCAA reviews of incurred cost are designed to assure procurement officials all costs incurred under and charged to specific contracts, as evidenced by contractor claim representations, are allowable, allocable, and reasonable. Despite numerous laws, regulations, and audit findings, defense contractors continuously attempt to pass on to the Government obviously unallowable costs in their overhead pools.

DCAA's audits of defense contractors forward pricing overhead rate proposals and final negotiated overhead rates are conducted to determine the reasonableness, allocability, and allowability of those costs used by contractors to develop their cost factors and overhead rates. Overhead rates are forward priced for procurement actions and then an audit is conducted at the end of the fiscal year to establish the final rate.

Discussions with DCAA officials and review of audit reports on forward pricing overhead rates disclosed the following examples of questionable costs submitted by DOD contractors.

-- Lobbying costs,
-- Home office expenses,
-- First class air travel,
-- Expenses for Davis Cup Tennis Program,
-- Relocation expenses,
-- Entertainment expenses, and
-- Patent expenses.

The above are just a few examples of unallowable costs which contractors are including as a part of their overhead rates for Government contracts. This issue is discussed further in this report.

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Evaluations of the Defense Contract Administrative Service (DCAS) and Plant Representative Offices (PRO)

The DCAS and military service plant representative officers, like Air Force Plant Representative Offices (AFPRO), perform two significant functions in contract pricing, for the contracting officer--they perform a technical evaluation of the proposal and analyze the contractor's price. When performing a price analysis, a cost audit is requested from DCAA. While DCAA concentrates on documentation to support material and labor costs, DCAS/PRO's use engineers, quality assurance people, and technicians to evaluate such items as the type of labor needed and the hours required. For many large procurements, contracting officers have their own in-house specialists, therefore, not requiring all the services of DCAS/or a military service plant representative office.

Technical Evaluations

ASPM No. 1, requires that technical evaluations of contractor proposals contain detailed explanations as to the extent and nature of analyses performed and the rationale for acceptance or rejection. More specifically, the analyses should identify what was analyzed, what factual data was used in the analyses, what conclusions were reached, and what reasons support the conclusions. Such evaulations address such matters as the number of proposed hours required for a specific job or contract, based on such things as shop practices, industrial engineering, time and motion studies, and the contractor plant organization and capabilities.

Technical evaluations are performed by either DCAS, one of the military service plant representative offices or, the buying command. The DAR requires that such reports be provided to DCAA for their use in the cost audits. Since the inception of DCAA, they have had problems receiving these reports before the due date of their audit. As a result, DCAA often has to issue supplemental reports. DCAA is now in the process of trying to have this DAR requirement changed.

Technical evaluations are too subjective, often based on the evaluator's personal judgment and are provided to contracting officers without support of some type of historical data. Sometimes, the reports involve (1) complex situations and accounting issues, (2) the use abstract theory, and (3) are difficult for contract personnel to understand. In some regions, where there is a shortage of engineers, unqualified price analysts are preparing the reports. There also is an increase in the use of boiler plate paragraphs and qualifications. All of these situations limit the value of the product and create a weaker bargaining position for the Government.

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Price Analysis

The conclusion that a price is fair and reasonable must be based on some form of analysis, either price or a combination of cost and price analysis. Because of the high demand for reports, price analysts are shortcutting the quality of the evaluation by relying on personal judgments instead of performing a thorough and competent analysis. For example, contracting officers advised that they cannot accept a price analyst's opinion that merely states that the contractor's costs are generally overstated by 10 percent as a bargaining point in negotiations. Consequently, the contracting officers are often forced to delay negotiations or drop the analyst's recommendation because of the unsupported data.

Contracting officers complained the price analysts often do not consider the previous procurement in justifying the reasonableness of the proposed price or even mention the proposed unit price. For example, one procurement was noted where the ASO made two procurements of piston kits from the same contractor during a three year span. In March 1977, a contract was awarded for 31 kits at $6,790 each, while in September 1980, the contractor proposed a price of $28,725 each for 13 kits, later negotiated to $25,400. The price analyst report did not consider the prior acquisition or attempt to justify the significant increase (374 percent) in unit prices between the prior buy and proposed procurement.

This particular criticism, failure to consider an item's prior acquisition history, was also reported by the U.S. Army Audit Agency in an April 1981 report to CECOM on their acqusition of nonstandard items.

Another related complaint by contracting officers was in numerous instances analysts fail to adequately justify why a significant increase in the quantity required does not result in a lower unit price. The contractor's price is accepted even though the proposed unit price was the same as paid in the previous buy for a small quantity. One analyst used such obscured language as there is an "increasing trend in plant overhead" to justify the increase.

Price Negotiation Memoranda

One document required after negotiations have been concluded is the price negotiation memorandum (PNM). According to the DAR and supplemental guidance of ASPM No.1, a PNM must be written after contract negotiations and must (1) set forth the principal elements of price negotiations, (2) be in sufficient detail to reflect the most significant considerations affecting price, (3) state why cost or pricing data was or was not required and the extent the data was relied on, (4) state the extent to which the contracting officer recognized that any data was inaccurate, incomplete, or noncurrent, and (5) track contract price from the

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contractor's cost proposal to the final negotiated price. Failure to identify such data results in an incomplete record to reviewing authorities, and can adversely affect the Government's entitlement to a price reduction, when a contractor has submitted defective data which was relied on by the Government.

The PNM's were generally considered by their customers (DCAA, DCAS, and AFPRO) to be poorly prepared and provided meager results of the negotiations, thus many negotiations were conducted on a total cost basis. Some of the PNMs were typed, while others were handwritten. In some instances, they were not submitted. A GAO report stated that in one DCAA office, 33 percent of the PNMs were not received, and in another office the deficiency was as a high as 43 percent.

Contracting officers claim that lack of resources and backlog forced them to accept the inadequate PNMs prepared by their negotiators. The PNM, however, is the only way the assisting organizations can get feedback as to how their work was used. The PMN information helps contract auditors determine whether, and to what extent, their findings were used so they may evaluate and improve their audit process as well as determine whether the audit techniques and related reporting needs revision. The information also brings any major differences or disagreements with contracting officers to the attention of top level DOD and procurement management officials.

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WEAKNESSES IN SETTLING UNALLOWABLE AND QUESTIONABLE COSTS

The interpretation of definitions in the Cost Accounting Standards and the Defense Acquisition Regulation are broad enough to result in legal action by contractors to obtain payment for expenses not envisioned by the Government when a contract was signed.

The following information is provided relative to the Committee's request for information on allowable cost principles, including what are allowable overhead costs in procurement practices. The Investigative Staff has found a number of areas of concern, in addition to those reported in September 1981. These concerns are:

-- Claims for costs related to goodwill
-- Unallowable costs
-- Questionable overhead costs
-- Reasonableness of overhead cost settlements
-- Inconsistent treatment of some overhead costs
-- Questioned leasing costs overlooked during negotiation

Claims for Costs Related to Goodwill

In 1977, a contractor included goodwill as an element of facilities capital and claimed the related costs under Cost Accounting Standard (CAS) 414. The related costs were subsequently disallowed as a reimbursable cost during contract performance. The contractor appealed to the Armed Services Board of Contract Appeals (ASBCA) and the dispute was heard during September 1981. The Board has not yet issued a decision.

During the appeal hearings before the ASBCA, the contractor expanded its claims as follows:

-- First Claim--approximately $5 million of recorded "goodwill" is claimed as an allowable element of facilities capital under CAS 414. Amortization of recorded "goodwill" is claimed as an allowable cost of performing Government contracts. The contractor contends that Defense Acquisition Regulation 15-205 does not specify that "goodwill" is unallowable. The Government contends that "goodwill" represents payment for future income in excess of a normal rate of return and, as such, is not a cost of doing business.

-- Second Claim--a $5.4 million unrecorded difference between the 1969 net book value of the acquired company tangible assets and the 1969 fair value of those assets when the two companies merged is claimed as an element of facilities capital under CAS 414. Depreciation on the unrecorded difference is also claimed as an allowable cost of performing Government contracts.

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The merger was a "part purchase - part pooling" business combination under generally accepted accounting principles (GAAP) in 1969. The contractor contends that a 1970 change in GAAP would have required this difference to be recorded had the changed GAAP been in effect in 1969. The contractor also relies on CAS 404 and the general cost principles in DAR as additional support for their claim. The Government contends that the 1970 change in GAAP prohibited its retroactive application, that the change does not meet certain tests in the DAR general cost principles, that CAS 404 does not apply to tangible assets acquired in 1969 and that DAR 15-205.9 limits allowable depreciation to amounts used for book and statement purposes. If the contractor prevails, every contractor who ever combined or combines with another company in a pooling of interests will want to recover the same type of unrecorded cost difference the contractor received.

-- Third Claim--the contractors third claim for unrecorded "goodwill" is identical to the first claim except that the amount increases. The contractor contends that had the 1969 merger been a purchase of assets rather than a pooling of interests, the $40 million recorded for "goodwill" could be as much as $80 million.

The combined effect of the three claims could increase the cost of performing contracts for the Navy by as much as $1.7 million in the first year. More importantly, at least 34 other companies who collectively have more than $3 billion of similar intangible assets or "goodwill" recorded on their books and who also perform Government contracts will want equal treatment. None of these 34 companies are known to have as yet claimed their "goodwill" as an element of facilities capital under CAS 414 or the amortization of their "goodwill" as a reimbursable cost of performing Government contracts.

Questionable Overhead Costs

Contractors who have been doing business with DOD for many years, continue to attempt to pass on unallowable costs totaling tens of millions of dollars. The costs which have been challenged by DCAA include many that are specifically unallowable by the Defense Acquisition Regulation (DAR). The fact that these costs continue to be submitted, apparently unabated, suggests that contractors are attempting to and are frequently succeeding in obtaining excess costs (profits) on Government contracts. They must be aware that the Government's audit effort is constrained and only a small percentage of these type costs will be identified. While the DAR is not always clear on every subject, it is quite clear on the unallowability of certain travel, entertainment, advertising, legal services, etc., costs. The following examples illustrate the types of unallowable costs contractors have attempted and may have passed on to the Government.

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Examples of Unallowable Costs
Billed by Contractors to DOD

Contractor	Types of Unallowable Costs Billed	Amount of Unallowable Costs	Contractor Total
A	Entertainment	$ 13,526	
	New venture administration	95,200	
	Washington office	206,000	
	Corporation foundations	699,000	
	Corporate advertising	1,465,800	
			$2,479,526
B	Legal fees	203,000	
	Sponsorship of tennis tournaments	1,153,000	
	Merger and acquisition costs	1,446,000	
	Legal costs for prosecution of claims against the Government	12,000	
	Allocability of direct charging of expenses	683,000	
	Pension management	14,000	
	Contributions	112,000	
	Amortization	31,000	
	Discontinued operations expenses	197,000	
			3,851,000
C	Government personnel meal costs	117,240	
	Off-site meeting costs	857	
	Alcoholic beverages	1,607	
			119,704
D	3-week business trip to Europe w/wife	8,225	
	First class air fare	808	
	Expense for wife	3,376	
	Liquor	19,400	
			31,809
E	Vehicle rental at Paris Air Show	27,180	
	Entertainment	3,754	
	Social activities	92,663	
			123,597
F	Golf outing	53,193	
	Hunting lodge for business meetings -	82,874	
	Exhibits, shows, brochures, and foreign military sales	220,445	
			356,512
TOTAL			$6,962,148

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DOD Method of Settlement Contributes to Abuses

In many cases contractors are successful in negotiating a settlement of questionable costs identified by DCAA on a lump sum basis without a breakdown of the specific costs involved. As a consequence of these negotiation actions DOD has allowed between 20 to 67 percent of these costs. DOD contracting officers and DCAA auditors believe the allowed percentages were reasonable for several reasons. They claim that a substantial portion of questioned costs result from contractor transactions not properly documented during an audit but supported before and after final negotiations. Also, many questioned costs result from auditors judgments in the so-called "gray areas" of allowability, allocability, and reasonableness listed in the DAR. DOD contracting officers must then decide whether the contractor or DCAA has the stronger case. In these instances, some contracting officers consider experience and percentages sustained in prior negotiations and use them as baselines for the current negotiations.

The following are specific examples.

Contractor E

DCAA questioned $4,689,598 in 1977 corporate overhead charges of which $1.5 million (32 percent) was sustained in negotiations. Details of the amount that was allowed to remain in the overhead pool and the rationale therefore was not provided to the DCAA. For example, $27,180 for vehicle rental at the Paris Air Show was questioned as unallowable advertising expense pursuant to DAR 15-205.1(a). No mention of this item could be identified in the make up of the $1.5 million upheld. DCAA also questioned $3,754 for entertainment and theatre tickets, greens fees, locker fees and handicap charges, and costs incurred at various country clubs. This amount was included as a part of $216,807 questioned under "professional services-other." The administrative contracting officer was successful in reducing the charges by only $25,000 (11.5 percent) in this area but there were no comments to identify the specific charges included in the $25,000 or the rationale for the negotiated amount not sustained.

In its audit of the 1978 corporate overhead pool charges, DCAA questioned about $5.5 million. DCAA again questioned similar type charges as those questioned in 1977. Such charges included disallowance of company-owned aircraft expenses because of lack of documentation as to the identity or purpose of travelers using the aircraft. DCAA questioned about $1.9 million of aircraft expenses in its audit of 1977 overhead pool charges and $2.9 million in 1978. In its review of 1978 overhead pool charges DCAA again questioned such items as membership costs in social clubs, a country club and various recreational clubs in the amount of $92,663. Also, the 1978 overhead pool was questioned regarding charges made for a Washington executive apartment. DCAA questioned $20,024 representing the expense of furnishing the apartment with bar stools, carpeting,

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sofa, bumper pool table, draperies, stereo system, color television, and a new kitchen. These expenditures were questioned as being related to entertainment.

Contractor F

Approximately 80 percent of the costs questioned by DCAA in its audit of 1979 overhead pools have been sustained in the Administrative Contracting Officer's negotiations of overhead rates with the contractor.

DCAA questioned a $53,193 charge for a golf outing as not allowable as entertainment pursuant to the DAR. These charges were completely removed from the overhead pool during negotiations. The contractor included in its overhead pools expenses totaling $99,848 for a hunting lodge maintained and used for business meetings. DCAA took exception to these charges on the basis that they were not allowable as entertainment expenses. During negotiations the contractor provided documentation to substantiate $16,974 which was accepted as allowable--the remainder was disallowed.

DCAA also questioned $220,445 for shows, exhibits, brochures, and Foreign Military Sales. This entire amount was disallowed by the administrative contracting officer during negotiations.

Another contractor included $67,685 for legal costs incurred in defense of antitrusts suits. Thus, the contractor was attempting to get the Government to pay his legal cost in a suit brought against him by the Government. DCAA questioned the inclusion as unallowable costs according to DAR 15-205.31(d). The contractor also included $93,474 of legal costs incurred in defense of warranty claims by commercial customers. The DCAA questioned this cost stating it was directly allocable to the contractor's commercial work. This is an attempt to have the "best of both worlds", the contractor offers a warranty to induce commercial sales but gets the Government to pay the cost.

Reasonableness of Overhead
Cost Settlements

A review of the final negotiation results at four contractor locations indicated that DCAA's questioned overhead costs were sustained by DOD contracting offices at rates of 33, 37, 46, and 52 percent. Yet, all DCAA resident auditors believe that the overhead settlements were reasonable. No one knows what a reasonable overhead disallowance settlement should be on a percentage basis.

DCAA resident auditors and contracting officers indicate that DAR's provision for allowability, allocability, and reasonableness tests of costs are broad. Consequently, many questioned costs are in so-called "gray areas" and subject to DOD officials judgments and contractor's persuasions. Some of these type of questioned

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costs go before the Armed Services Board of Contract Appeals (ASBCA). For example, DCAA questioned $1,528,397 allocation of franchise taxes and ASBCA's subsequent ruling allowed these costs.

The following type of reasons were provided to the Investigative Staff for DCAA's not questioning the final negotiation results. Many of DCAA's questioned costs result from a lack of proper contractor data or explanation of the transactions. One auditor said that the contractor, rather than trying to document the transaction during the audit tells the auditor to question it, knowing that he can support the cost at a later time. Had this data been provided during the audit the costs may never have been questioned or reported by DCAA. One resident auditor, however, could not estimate what portion of his questioned costs fell into this category. One contracting officer's target for unsupported costs is arbitrarily to disallow 50 percent.

Inconsistent Treatment of Some Overhead Costs

Other areas of inconsistent treatment of some overhead costs have been noted. Examples concerning cafeteria operations and operation of contractor aircraft are provided.

Cafeteria Operations

One contracting officer has an advance agreement with a contractor to share food service losses for FY's 1978, 1979, and 1980. The sharing ratios are 80 percent for DOD and 20 percent for the contractor. The net operating loss for the contractor's cafeteria operations during 1978 was settled at $188,605. DOD's and the contractor's shares were $148,884 and $39,721, respectively.

The Air Force Contract Management Division (AFCMD) was requested to query its contracting officers to determine the methods used to settle contractor's cafeteria losses. As most of these losses occur from occupancy costs distributed to cafeteria operations, the purpose of the study was to determine if the losses included occupancy costs.

The study by AFCMD indicated that four have advance sharing agreements as detailed below.

Sharing Percentage

Contractor	DOD	Contractor
J ----------	80	20
K ----------	100	0
L ----------	0	100
M ----------	0	100

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Only 8 of the remaining 15 contractors, recorded cafeteria losses and DOD negotiated them as follows:

Number of Contractors	Percent Allowed	Percent Disallowed
5	100	0
1	65	35
2	50	50

Of the seven contractors that do not record losses, four do not consider occupancy costs as cafeteria expenses. Although all DCAA regional offices were not queried, one region has interpreted a headquarters memorandum to include occupancy costs as part of food service to determine if the contractor established the objective of operating the facility on a "break-even" basis as required by DAR 15.205.10(c).

Contractor Aircraft Operation

Two DOD contracting officers treated DCAA's questioned excessive costs for company operated aircraft differently. Both contracting officers negotiated the questioned costs as a bottom line (lump sum) settlement. One allocated all of these costs as unallowable while the other allocated 57 percent as unallowable. In both cases the contractor considered the total amounts as allowable. Contractors have appealed the unallowability of aircraft costs and the cases are pending at ASBCA.

Questioned Leasing Costs Overlooked During Negotiations

DCAA questioned $1,641,700 of excess leasing over constructive ownership costs at one contractor's plant. The contractor agreed that $567,100 was unallowable. However, during final negotiations the entire $567,100 was inadvertently overlooked and the amount was allowed. Cost of money rates were negotiated separately and DOD was able to offset $337,100 applicable to the constructive ownership computation for these lands and buildings. The net effect was that the contractor was allowed $230,000 for excessive leasing costs which should have been disallowed. The contracting officer did not reopen negotiations on the basis that the contractor would also be permitted to revise his position on concessions previously made.

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UNCOORDINATED STOCK FUND PROCUREMENTS AND REASONABLENESS OF PRICES PAID

Aggressive action to expand the use of competition and limit sole-source contracting can do more to contain the rising cost of Defense supplies and services than any identifiable price negotiation technique.

DOD executes about 10 million procurement actions each year. (There were over 12.7 million procurement actions in FY 1981.) Many of these actions are for stock funded items and there are at least 20 major procuring agencies. In addition, thousands of stock funded items can be procured locally by any of DOD's field units. Although there are about 10 million procurement actions each year, DOD only has computerized information for about 300,000 of these actions. While the percent of computerized actions is small, the obligated value of these contracts amount to some $98 billion.

The Investigative Staff selected samples of the 300,000 items and evaluated the reasonableness of prices paid on items being purchased across the country by procurement offices of the Army, Air Force, and Navy.

The Cost of DOD Procurement and Possible Savings Through Increased Competition

During FY 1981, DOD issued prime contracts totalling more than $105.2 billion, up from nearly $83.7 billion in FY 1980, an increase of 25.7 percent. Of this amount, prime contracts awarded after solicitation and receipt of two or more responsive offers for competitive price, design, or technical proposals totalled $35.9 billion in FY 1981 and represented 40.7 percent of the net amount of procurement (excluding intragovernmental orders and other exclusions) compared to $25.1 billion and 36.0 percent for FY 1980. Noncompetitive awards during FY 1981 totaled nearly $52.3 billion or 59.3 percent of the net amount. Prime contract awards over $10,000 for supplies and equipment during FY 1981 totaled $64.0 billion--up from $46.9 billion for an increase of 36.5 percent over FY 1980. These awards cover the federal supply classification structure composed of 77 groups and 636 individual classes of items.

Studies by the U.S. General Accounting Office (GAO) and others have indicated as much as 25 percent can be saved through increased competition. (GAO report PLRD-81-45)

In FY 1981, DOD issued contracts for more than $64 billion for supplies and equipment. Of this total, over $42 billion or 66 percent was issued as noncompetitive procurement. By applying

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the 25 percent savings through increased competition reported by GAO and switching noncompetitive procurement to competitive procurement, an estimated $10.5 billion might be saved. Stated another way, an estimated $105 million could be saved for each 1 percent of increased competition for this category of purchases. (If all DOD purchases excluding intragovernmental, and other exclusions, were considered, then $220 million could be saved for each 1 percent of increased competition.)

Fairness and Reasonableness of Price

According to one study on the issue of fairness and reasonableness of price, the fairness and reasonableness of a particular contract price arrived at through negotiations--was irrelevant! It was irrelevant as the result of contracting officers inability to negotiate a fair and reasonable contract price because the only thing that mattered was that the requirement be fulfilled at the budgeted figure! According to the report, contracting officers in the field agree that what the policy makers and the academicians preach is unobtainable in reality due to personnel shortages and insufficent training on the part of Government procurement teams. In three instances cited by the report, situations were related to the author that indicated little, if any, time was available to study cost estimates of contractors proposals in depth. In most instances, labor rates and overhead rates were the major topics of negotiation prior to settlement on a bottom line figure which was dictated by the Government budget for a specific procurement. It appears it is considered a mistake in the field to return with money from a negotiation (a deobligation action would be required).

It is apparently felt that with the critical shortage of time to get procurements on the street and issued, to attempt to generate more funds and obtain more reasonable pricing through hard negotiations simply serves to compound the problems of too much to do with too little time to do it. Ultimately, the upshot is that the Government contracting officers, are going through the motions of negotiating the fairest and most reasonable contract price they can obtain. However, the truth of the matter is that obligating available funds is where the emphasis is placed!

According to the study, it is felt that a contractor has a better idea of what constitutes fair and reasonable prices than do Government procurement teams. It is also felt that there is a lack of necessary in-house expertise to evaluate a technical proposal adequately. The result is that a Government procurement team cannot support substantive arguments against what it feels to be an unfair and/or unreasonable cost element.

High Sole-Source Prices

Noncompetitive procurement is the high priced option. Numerous cases were found in which prices on noncompetitive buys were

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higher than competitive prices and prices increased at startling rates. DOD has extensive procurement regulations and expends much management and analytical effort to assure that prices paid for supplies are "fair and reasonable." Instances were noted in which DOD:

-- Paid higher negotiated prices than competitive prices

-- Paid higher prices to a prime contractor than was available from the manufacturer

-- Paid higher prices to a sole-source contractor which was about three times the cost than when the procurement was competed

-- Failed to take advantage of a low bid

-- Improperly classified a bid as competitive when there was no competition

-- Is paying rapidly rising prices needlessly

-- Did not provide incentives to use the most efficient production methods

-- Was forced to pay premium prices for "expedited" service

-- Failed to obtain cost and pricing data

-- Paid catalog prices which were nearly double the price available to commercial buyers

-- Used more than one buyer to buy the same item at different prices

-- Did not take advantage of consolidating purchases to receive a lower price

These weakenesses produced overpricing and rapidly escalating prices, factors which are inherent in the noncompetitive environment.

Sole-Source Procurement

The following are examples of sole-source procurements which resulted in the payment of higher prices.

Negotiated Prices Much Higher Than Competitive Prices

-- In 1978 and 1979, San Antonio Air Logistics Center (SAALC) bought test fixtures for an

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angle of attack transducer sole-source from the prime contractor on two occasions for a total price of $24,648. In 1981, a SAALC buyer who was aware the prime did not actually manufacture the fixtures provided the actual manufacturer an opportunity to bid. The manufacturer's bid was 12 percent lower than the price negotiated with the prime almost 2 years earlier.

-- Up until 1973, SAALC bought aircraft ground locks competitively, and the last buy in 1973 was for 238 locks at $37 each. The procurement method code indicated the lock data package was complete and the item was legally clear for advertising. Later, however, SAALC erroneously recorded the data as proprietary and in 1980 bought 110 locks sole-source from the prime contractor for $93,057. The prime's unit price of $846 was nearly 23 times the 1973 price. The prime's price was also about 3.5 times the unsolicited bid received from another company. This company bid $243.17 per unit but later withdrew the offer after the SAALC buyer mistakenly informed him that the prime had proprietary rights to the lock's engineering data and legal clearance from the prime would have to be obtained before the bid could be considered. When contacted by the Investigative Staff, a company official said he could definitely have supplied the locks for $243.17 each and did not need engineering data to do so because he planned to subcontract 100 percent of the production to one of the prime's vendors. SAALC could have saved over $66,000 by accepting the low bid.

-- In September 1979 and again in February 1981, SAALC bought canopy actuators sole-source from the prime contractor for a total cost of $564,406. The unit price increased from $3,014 for 32 actuators in 1979 to $7,312 for 64 actuators in 1981. The prime did not actually manufacture the basic actuator. Later in 1981 SAALC solicited competitive bids from two companies who were manufacturers. The resulting low bid of $3,751 each for 38 actuators was 49 percent lower than the previous sole-source price. If the 1981 purchase from the prime had been made competitively, SAALC might have saved nearly $228,000.

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Rapid Price Increases

The unit prices of some sole-source items have increased at rates far greater than normal inflation as described below.

Line Radios

Line radios provide an example of rapid price increases. Since late 1976, SAALC has bought the radios sole-source from the prime contractor on five occasions at a total cost of $109,065. From 1976 to 1978, the price was under $700 each. In 1981, however, the unit price increased to $2,367 on one buy and to $3,448 on another buy 70 days later. Even though the latter price is 5 times the 1978 price, the SAALC buyer concluded it was fair and reasonable based on competition. Prior to placing the order with the prime, the buyer had solicited one other company known to produce similar items and received a bid 44 percent higher than that offered by the prime. The buyer was aware from earlier procurements that quantity production gave the prime an advantage over the other company, but nevertheless, determined that adequate competition was present because two bids existed. DAR 3-807.1 indicates that competition should not be considered adequate if the low competitor has such an advantage over the other competitors that he is practically immune to the stimulus of competition.

Piston Assemblies

A review by the Investigative Staff of two Navy procurements, from the same contractor, on a non-competitive award for piston assemblies and jack pads (piston kits), disclosed the contracting officer paid an unjustified 370 percent price increase over the first contract or $111,000 more than necessary. A Government audit of the contractors proposal, a technical evaluation and price analysis failed to adequately justify the unreasonable price increase during the timeframe between the two buys. The following case is another example of a rapid price increase for the same item.

First Procurement

On March 10, 1977, the U.S. Navy Aviation Supply Office (ASO) issued a contract for 31 piston kits at $6,790 each. By May 30, 1980, 25 each were shipped and on January 21, 1981, the contractor informed ASO the remaining six kits had to be scrapped in their shop. The contractor, therefore, gave ASO the option of closing out the contract at 25 units or transferring the requirement for six each at the old unit price to a new ASO procurement with the contractor for the same item. On March 4, 1981, ASO issued a change order reducing their requirements and closing out the old contract at 25 piston kits. This action constituted a refusal by the Navy of the contractor's offer of six piston kits at the old unit price.

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Second Procurement

In early 1979, ASO initiated action to place an unpriced order with the same contractor for 35 more piston kits. On May 21, 1980, ASO issued an order for 13 piston kits with a monetary limit of $20,160 each. On January 19, 1981, or 2 days prior to the contractor's offer to provide six piston kits at $6,790 each on the current contract, ASO increased the monetary limit to $28,725 each. The order was finally priced at $25,400 each on May 5, 1981--more than 3 months after the contractor offered to sell six of the items at $6,790.

Cost and Pricing Evaluations

Reports issued by the Defense Contract Audit Agency (DCAA) and Defense Contract Administrative Service Management Area (DCASMA) on the contractor's proposal, technical capability, and pricing did not consider the difference in unit price between the two buys. The various evaluations only concluded that the contractor's proposal is "acceptable as a basis for negotiation of a price." These reports did substantiate an annual price escalation of 17 percent for some of the cost elements. The various reports and other contract documentation disclose that, in the first contract, the contractor subcontracted the majority of the job effort, however, because of possible quality control and delivery problems, decided to perform most of the job effort in-house for the second buy. The various reports, however, failed to consider a make or buy analysis. There also was no attempt to develop another source from previous subcontractors.

The Navy advised that this contractor is the only acceptable supply source, except for the aircraft prime manufacturer, for the piston kits. Although they state they recognized the significant increase in price during the three year period, DCAA and DCASMA provided them with no basis to reject the proposal because of an unreasonable price.

In regard to ASO's rejection of the contractors offer to provide six piston kits on the new contract at the old unit price, the ASO procurement personnel admitted that, because of a recent reorganization, the piston kits were transferred to different buying unit. Therefore, inadequate communication between the old and new buying units resulted in ASO's initial rejection of the contractor's offer. ASO is now negotiating with the contractor with the objective of reducing the current contract costs by over $111,000.

Cost and Pricing Data

In some cases, DAR provides for a waiver of the requirement for the submission of cost and pricing data, and this provision also, if improperly applied, can permit rapid price increases. The flight instrument case discussed below illustrates the point.

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Flight Instrument

Since June 1980, SAALC has placed three sole-source orders for the flight instrument at a total cost of $302,820. On two orders, the unit price was under $4,000, but on the 1981 order it nearly doubled in price to $7,884. Despite DCAS and DCAA advice to the contrary, SAALC determined the latter price fair and reasonable based on DAR provisions which permit waiver of the requirement to submit certified cost and pricing data for items sold in substantial quantities to the general public. For such "commercial" items, the price paid by the Government can be based on the contractor's established catalog price.

The saga of the $7,884 unit price began on March 6, 1981, when SAALC sent the contractor a request for proposal for 15 flight instruments. The contractor responded on April 6 with a bid of $7,884 each for a total price of $118,260. The unit price was supported by an internal price bulletin intended to establish selling prices for the instruments. It was noted: (1) the bulletin was dated about 2 weeks after SAALC's request for proposal, and (2) the net price listed for the model of instrument bought by the Air Force was about twice the price listed on the previous price bulletin.

On April 22, the contractor submitted a claim for exemption from submission of certified cost or pricing data on the basis that the price offered the Government was based on an established catalog price of an item sold in substantial quantities to the general public. Attached to the claim was a sales history for various instrument part numbers (configurations), but it did not show any sales at the higher prices listed on the March 20 price bulletin. For this reason, SAALC notified the contractor that the claim was disallowed in that it did not meet the requirements of DAR 3-807 for a commercial catalog item.

At about the same time, SAALC also asked DCAS and DCAA for assistance in determining if the instrument was a commercial catalog item and whether the price was reasonable. Both DCAS and DCAA agreed that the instrument did not qualify as a commercial catalog item and recommended that cost or pricing data be required. They pointed out that the particular part number configuration desired by the Air Force was peculiar to Government use and there had been no commercial sales of this configuration. DCAA pointed out there had been commercial sales of similar instruments but the contractor had not provided cost support for the significant differences between the commercial and Government versions. With regard to unit price, DCAA recommended $3,500 which included 15 percent profit.

By message dated May 14, 1981, the contractor refused to submit cost and pricing data and maintained that the data previously submitted qualified the instrument as a commercial catalog item.

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On June 24, the SAALC buyer asked the contractor by telephone to review his proposal bearing in mind the much lower prices paid in 1980. The buyer also informed the contractor that if he wanted the award and if his total proposal remained over $100,000 he would have to comply with public law and submit the cost and pricing data.

After an additional 5 weeks impasse, SAALC agreed to pay the contractor's originally proposed price of $7,884 each. Despite the DCAS and DCAA findings, SAALC concluded that the instrument was "commercial catalog in nature" and the price was "fair and reasonable." Although SAALC's official price negotiation memorandum states there were no outside influences or time pressures which may have influenced negotiations, a hand written note in the contract file indicates the award needed to be finalized by August 21 because the contractor "has emphatically stated they will not extend" the acceptance period of their offer.

In October 1981, a DCAS official said it is still the DCAS and DCAA position that the instrument does not qualify as a commercial catalog item and that SAALC should have required certified cost or pricing data. In commenting on the fact that SAALC had overruled the DCAS/DCAA position, the official said he had no way of knowing what kind of pressures SAALC may have been under to get the contract awarded. Speaking in general terms, he said that sole-source contractors put purchasing offices "behind the eight ball" when they make "take it or leave it" proposals. If the purchasing office wants the item badly enough, price becomes a minor consideration.

Since SAALC was paying the full catalog price for its instruments, DCAS was asked to determine if the contractor's commercial sales of similar instruments were made at catalog prices. After reviewing three sales, DCAS reported that the contractor does not consistently charge his commercial customers the exact catalog price. One of the three sales was at catalog, another was at catalog less a 5 percent discount, and the third was based on a pricing technique unrelated to the catalog price. From this information, a DCAS official inferred that the contractor's policy is to charge "what the traffic will bear."

Other Cases of Rising Prices

The following schedule provides other examples where procurement practices of DOD have resulted in increased prices being charged to the Government. The increased prices are the result of: (1) failure to consolidate requirements (2) the payment of significantly higher prices on similiar quantities and (3) significant price increases on the procurement of the same item from the same contractor.

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Examples Where Procurement Practices of DOD Have Resulted in Increased Prices

Item	Contractor/Date Contract Signed	Quantity	Unit Price	Comments
Bolt assembly	A. 3/1/78	130	$ 23.78	Price increase of 158% in 2 years between contractor A and contractor B.
	B. 2/1/80	91	61.24	
	4/2/81	96	55.00	
Bolt assembly	A. 3/1/78	55	23.78	Price increase of 128% in a 3 year period on a larger quantity purchase.
	B. 2/25/81	114	54.22	
Transmission cooler	A. 1/31/80	56	2,820.00	Price increase of 35% in 17 months but on smaller quantity purchase. Bids limited to this contractor and one other which did not bid.
	6/4/81	25	3,812.60	
Retainer, shaft	A. 12/18/80	166	47.07	Both contracts could have been consolidated since buy order for latest contract was issued 10/9/80, well ahead of contract award on 12/18/80.
	4/30/81	123	45.00	
Parts kit	A. 10/9/80	2386	24.93	Price difference of 56% in 3 months from the same contractor.
	1/23/81	5096	15.93	
Bezel assembly	A. 6/21/80	7	181.30	Price increase of 78% in 5 months on item purchased from the same contractor.
	A. 11/29/80	18	322.85	

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Uneconomical Order Quantities

The Sacramento Air Logistics Center processed an uneconomical lot of 40 pin assemblies for repair at a premium unit cost of $81.57 because 20 units were temporarily lost. The contract for repair of these pin assemblies provides a $53.44 unit price for lot quantities of 50 units or more and $81.57 for quantities of less than 50 units.

The inventory manager advised that 80 units were returned from Europe for repair. Of the 80, 20 were not repairable and 20 were misplaced. The remaining 40 units were sent to the contractor even though an additional unit cost of $28.02 or a total of $1,121 extra cost had to be paid because the pin assemblies were the highest priority of their back orders. Subsequently, the misplaced units were found and became a part of the next lot of 134 units which were processed at the $53.55 economical price.

Two Buyers for the Same Item

One buyer at the Sacramento Air Logistics Center competitively purchased five duct assemblies for the F-111 aircraft at $950 each while another buyer was in the process of purchasing nine of the same units at $392 each from another company. This resulted in a 142 percent higher unit price and unnecessary costs to the Air Force of $2,790 for the first buy. The units were bought separately because purchase requests were submitted by the inventory manager in November 1980 for nine units and in January 1981 for five units. The company that submitted the $392 unit price was not solicited for the subsequent purchase request because different source lists were used.

Procurement officials said it is not uncommon that different buyers would be purchasing the same part because at times it is necessary that buyers share the procurement workload.

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QUESTIONABLE MANAGEMENT PRACTICES LEAD TO LOST OPPORTUNITIES TO REDUCE COSTS

A variety of management weaknesses exist at Defense procurement offices. These weaknesses range from (1) failing to consolidate procurements in order to take advantage of economic production with resultant lower prices, (2) categorizing prices as "competitive" when, in reality this was not an adequate basis for accepting proposed prices, and (3) using competitive negotiation procedures with "best and final offers" when sole-source negotiations would have been more effective and economical.

Failure to Consolidate and/or Coordinate Procurements is Costly

Failure to coordinate and/or consolidate procurements not only leads to higher prices but also increases the costs for contract administration and procurement. For example:

Rotary Wing Head Weight

Four contracts were issued for this item during a 5-month period as shown below:

Date of Award	Quantity	Unit Price
11/6/80 -----	475	$20.56
12/12/80 ----	571	21.55
4/3/81 ------	1,436	17.55
4/10/81 -----	30	52.50

The difference between the low price of $17.55 and the high price of $52.50 is about 200 percent. In addition, two of the contracts were awarded only 1 week apart. All four contracts, however, could have been consolidated because the buy order for the last contract was issued a month before the earliest contract was awarded. Consolidation of the four contracts at the lowest price could have resulted in a savings of about $4,800.

Tail Rotor Assembly Slide

On January 9, 1981, a contract was awarded for 754 slides at a unit price of $27.68. Subsequently, another contract was awarded for the same item for a quantity of 757 and a unit price of $15.45. Both contracts could have been consolidated since the buy order for the latter contract was issued on November 3, 1980, more than 2 months prior to the award of the earlier contract. Consolidation of the two contracts probably would have lowered

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the unit price to at least $15.45, the price awarded on the later contract with a resultant savings of about $9,000.

Split Plate Assembly

A contract awarded on May 18, 1981, was for one assembly at a cost of $900. About 2 months prior to this award a contract was awarded for four assemblies at a cost of $360 each. Both of these contracts could have been consolidated. The procurement request for the one assembly was issued on December 22, 1980, far in advance of the contract which was awarded on March 9, 1981. The procurement request for the second buy noted that there was another open procurement request not yet on contract. However, different buyers in the Simplified Purchases Branch handled these procurement requests and the buyer of one assembly did not send a bid package to the other buyer.

The problem on the above multiple procurements was caused by having two different procurement sections issue contracts for the same item. While the mechanism exists to make buyers aware of any unawarded procurement requests by automatically annotating this fact on the request, buyers are apparently ignoring this information and are indifferent to consolidating contracts. This is evident based on a test which showed that 16 of the 31 contracts reviewed could have been consolidated into six contracts with savings occurring due to lower prices from quantity discounts and less contract administration.

Inadequate Basis Cited to Justify Contract Award

The following examples illustrate the increased costs experienced when questionable contracting practices are used.

Valve Assembly

In 1977, two sources (the prime contractor and a small business) were recognized as sources for a valve assembly. During that year, two contracts for 52 valves were awarded to the small business at an average unit price of $257. On two 1979 contracts, however, the small business "no bid" because it no longer had the necessary tooling. Sole-source negotiations with the prime for 127 valves resulted in a unit price of about $759, about 300 percent over the 1977 price. The contracting officer concluded the significant price increase was the result of sole-source condition but nevertheless found the price "fair and reasonable."

Fittings

A similar instance was noted at another procurement office; seven fittings were purchased in April 1981 at a unit price of $3,549.58, for a total cost of $24,847.06. In mid-1979, the same firm had provided eight fittings for $310 each and in late 1979 another firm contracted for six units at $468.

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Three firms, including the incumbent contractor, actively competed for these awards. However, one firm defaulted and another was in financial difficulty. Thus, the incumbent contractor was the only one of the three to submit a bid. Nevertheless, the bid was classified as competitive and the contract awarded without any attempt to negotiate a lower price.

Film Editor

At another location a 16mm film editor was purchased in April 1981, for $15,874. The purchase request identified the manufacturer and model number but did not suggest a sole-source procurement. As a result, the base procuring office intended to advertise the award in the Commerce Business Daily as a small business set aside. Upon learning of the competitive approach, the requestor processed a selected source memorandum to justify sole-source procurement and the contracting officer issued a Determination and Finding Statement to negotiate the proposed acquisition pursuant to 10 U.S.C. 2304(a)(10).

The Selected Source Memorandum identified the particular brand and model as its minimum requirements, claiming that it was not foreign made, and was most economical to operate and maintain. Seven identical units had been purchased over the past several years.

In response to an inquiry, a foreign manufacturer that recently began manufacturing equivalent units in this country was identified. It was confirmed that this firm has been producing 16mm film editors domestically since January 1979. When shown the specifications of the units from this source the user agreed it met his requirements. In addition, another source was located by referring to the yellow pages of the local telephone directory.

Synthesizer

A similar instance occurred at another procurement office. A synthesizer was purchased sole-source in January 1981 at a cost of $23,195.

Originally, the project manager took the critical specifications and matched them to the General Services schedule. Finding the frequency synthesizer on the schedule, he ordered it for $21,200. However, before the acquisition process could be completed, the General Services contract expired and was not renewed. Consequently, the purchase was processed as a sole-source procurement. The project manager said the he did no further market research because the synthesizer on the General Services schedule met the critical features. The project manager agreed, however, that the procurement could have been competitive.

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Elevators

In another case, four elevators were purchased sole-source in FY's 1980 and 1981 for $111,547. Even though the project manager knew a second source existed, he circumvented the competitive selection process by obtaining informal price quotations and writing a sole-source justification for the undocumented lowest bidder.

The elevators were used to bring existing office buildings into compliance with Federal regulations on handicap accessibility. According to the project manager, one civilian employee had fallen twice while using stairs to get to her work. For this reason, he felt it was necessary and proper to bypass normal procedures to save installation time. Sole-source selection was credited with saving 6 months. Early selection of the manufacturer permitted in-house elevator shaft design and concurrent contracting for elevator manufacture and shaft construction.

However, since planning began in June 1978 to install elevators, the project manager was fully aware of the obligation. Furthermore, no urgency determination was made and the contract for the fourth elevator awaited 1981 funding.

Although the project manager believes the Government received the lowest possible price, it is the responsibility of the contracting officer to make the determination through the competitive process. The contracting officer agreed the procurements should not have been sole-source because at least two known sources existed.

Transponders

Another lost opportunity to obtain competitive bids involved transponders. A contract for 200 transponders costing $1,248,235 was awarded to the only firm that submitted a proposal. The contract also provided for an option of 100 more at a cost of $536,868, or a total contract of 300 units costing $1,785,103. The option was exercised on January 28, 1981.

The proposed procurement was advertised in the Commerce Business Daily on March 4, 1980, for competition under Invitation for Bid procedures. The bid opening date was April 3, 1980. Shortly after March 6, solicitation packages were sent to 30 prospective bidders. However, effective March 19, 1980, the IFB was amended to Request for Proposals (RFP) without any time extension beyond April 3, 1980. Consequently, the prospective bidders had only about 2 weeks to prepare proposals.

The decision to change to an RFP resulted from technical issues raised by the only firm to submit a proposal. Three firms, however, responded that insufficient time was allowed for preparing proposals. One of these firms had been supplying other transponders for several years.

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The contracting officer involved in this procurement said he normally allows contractors 30 days to submit proposals. Although the files do not indicate any evidence of urgency, he believed that the requesting unit may have verbally disapproved any time extension for the bids. The requesting unit official, however, told us allowing additional time for the preparation of proposals would not have been detrimental. In fact, a competitive award may have resulted in earlier deliveries because the sole-source award was not made until August 15, 1980, 4 months later due to the lengthy negotiation process.

An instance was also noted where a follow-on contract was awarded on a sole-source basis despite the fact that two firms had been found technically qualified on the earlier award.

Calibrators

An initial purchase of calibrators was made on August 23, 1978, for 250 units at a price of $4,080,403. The contract quantity was increased to 375 units for $6,096,615 on April 13, 1979. The contract was awarded based upon technical and price competition. Two contractors were found technically qualified and the low bidder received the award based upon a $116,846 price difference.

A follow-on contract for 73 calibrators costing $1,858,872 was awarded to the prior low bidder. The sole-source quantity was subsequently increased to 139 units at a cost of $3,539,496.

Project management personnel indicated that the introduction of a new supplier would result in additional costs of $126,000 from various factors such as the (1) designing, developing, fabricating, and testing a first article; (2) developing new provisioning data; (3) additional support documentation, such as training manuals, calibration procedures; and (4) operation and maintenance training.

The Chief of Contracts stated, however, that it was standard practice to award follow-on contracts to the prior successful bidders because they had a proven product and the facilities to produce the items.

Transponders

A more dramatic example of the above practice is the use of a sole-source contractor over the past 10 years to supply transponder group sets used in target drones. Local officials did not know how many sets had been purchased but available records showed 700 had been purchased at a cost of $3.7 million since FY 1975.

The drones are used with a portable tracking system purchased in 1969 from the same contractor. The system was to serve on an interim basis until an Integrated Target Control System (ITCS) became operational. The intended use of the interim system was

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only 2 years but funding restrictions on the procurement of the ITCS dictated use until 1982, or 13 years later.

Apparently some discussion about a competitive data package occurred in 1974. At that time, the contractor indicated that the sets were designed and developed at his expense and that his price for a complete data package including his proprietary rights would be approximately $500,000. None of the current local officials were involved in these procurements, however, one official surmised that a competitive data package was not purchased because the sets were used in conjunction with an interim system.

A realistic review would have established the long-term need for an interim system and that a competitive package would have been worthwhile because several contractors manufacture transponders. Interestingly, the developer of the new ITCS also produces transponders and he could have been a second source for these items during the period.

Unexplained Price Variances

Wide variances on recent purchases by several DOD buying activities were noted during the review. The reasons for these variances were not readily explainable but are presented here because they appear to be evidence of uncoordinated procurements or indicative of a willingness on the part of DOD to "pay what is asked."

-- An air logistics center awarded a contract on May 21, 1981, for 80 shafts at a unit price of $7.50. The same center during the same year issued another buy for two of the same item at a unit price of $188.08.

-- A Navy contract was awarded on March 14, 1980, for 16 rod end assemblies at a unit price of $204.43. On March 15, 1981, 12 more of the item were purchased from the same contractor at a unit price of $602.14, about a 195 percent increase in 12 months.

-- The Army purchased 11 torque wrench fixtures on November 15, 1980, at a unit price of $590. Six months later, April 8, 1981, it bought 11 more at a unit price of $490.

-- The Air Force bought 26 voltage regulators on September 2, 1980, at a unit cost of $692. On March 23, 1981, four more were bought at a unit price of $1,155, an increase of 67 percent.

-- The Navy bought 13 circuit card assemblies on February 1, 1981, at a unit cost of $174.95. On May 10, 1981, 3 months later, 22 of the assemblies were purchased at a unit cost of $262.40, a 50 percent increase in 3 months.

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-- The Army bought 24 shafts at a unit price of $32.50 on December 4, 1980. On February 9, 1981, 27 more were bought at a unit cost of $51.00, a 57 percent increase in 2 months.

Use of Inappropriate Procurement Techniques

A lack of competitive procurement practices and poor judgment by contracting officers resulted in increased prices as illustrated in the following examples.

Upgrade Facilities Contract

A firm-fixed price contract was issued on May 23, 1980, in the amount of $9,667,001 to upgrade facilities. The contract contained two options for $20,050,477 and $23,782,546. The first option has been exercised and the second will be. The total contract price therefore is $53,500,024.

Twenty firms were solicited but only one responded. The contractor submitted a proposal of $48,926,429 on December 21, 1979, and a Best and Final Offer (BAFO) of $53,499,994 on May 23, 1980. The difference in amounts was due primarily for installation of two additional computers, one motor generator, and other changes to the basic proposal. The BAFO did not reduce the original proposal of $48,926,429, that had been reviewed by the Defense Contract Audit Agency. The agency questioned costs of $1,083,028 and reported unsupported costs of $559,403 for a total $1,642,431. The contracting officer stated that there was no attempt to negotiate any of the audit findings with the contractor. He said that the audit findings were brought to the contractor's attention but it was found that none of the questioned costs were eliminated by the contractor. For example, the audit agency questioned $100,477 of purchased parts because (1) the contractor used a higher price quotation dated November 27, 1979, rather than a lower price quotation dated December 11, 1979, from the same vendor; and (2) the contractor did not provide for a 15 percent cumulative discount allowed by a vendor. The agency, also questioned $144,936 in direct labor costs from potential savings that will result in design and drafting departments when the contractor implements the computer-aided design technology.

The Investigative Staff questioned the decision to award a contract on the basis of a BAFO when only one offeror responded and especially when prior to the BAFO the Source Selection Authority wrote a letter accusing the contractor of not putting forth his best effort when the contractor determined that he would be the only bidder.

The Source Selection Authority stated that in this case a procedural error occurred and that hindsight would prohibit the use of a BAFO rather than sole-source negotiation. The authority agreed that it would have been more feasible to have

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negotiated this procurement using data obtained by DCAA and by other advisors to the contracting officer.

Design and Development Contract

A firm fixed-price contract was awarded on June 14, 1979, in the amount of $11,247,388. The contract also contained Option 1 for $9,720,469 or Option 2 for $6,420,073. Option 2 was exercised on September 27, 1979, thus the total price was $17,667,461.

Of four firms that were asked for requests for proposals, only one firm responded with a technical proposal. The contractor proposed a firm fixed price on March 28, 1979, which included the basic contract proposal of $10,659,871 and Option 1 for $11,229,477. The proposed costs were audited by DCAA which questioned $305,056 for both the basic ($62,898) and Option 1 proposals ($242,158). In addition, a technical team questioned other costs. For example, it questioned $140,432 in labor costs for Option 1. The Government's objective included the technical team's assessment and DCAA findings, which were discussed with the contractor prior to the submission of a BAFO.

Comparison of the BAFO with the Government's objective follows:

	Basic	Option 2	Total
BAFO -------	$11,247,388	$6,420,073	$17,667,461
Objective --	11,155,018	6,042,460	17,197,478
Difference -	$ 92,370	$ 377,613	$ 469,983

The negotiated price was $469,983 above the Government's objectives. The contracting officer said that during negotiations the contractor was advised of the questioned costs and profits and was instructed to consider them and return with a BAFO. He further stated that there was no intention to evaluate and further negotiate the BAFO.

The two examples cited above are in essence sole-source awards made without meaningful negotiations and (despite ample evidence) the prices were not fair and reasonable. Further, the use of BAFO's when there is no competitive range and requests to contractors "to consider" audit agency's findings is a subterfuge. It is quite obvious that both of these contracts should have been negotiated on the basis of DCAA's findings while recognizing the awards were, in fact, sole-source. The $469,983 could, and in all likelihood will be, a "windfall" to the contractor. The same can be said about a substantial proportion of the $1,642,431 cited in the first example.

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Undue Emphasis Given to Technical Aspects of Certain Contracts

Two contracts were noted in which almost total emphasis was given to the technical and management aspects of the contract and little or no consideration was given to cost (to include questionable ones). Specifically, a Cost-Plus-Incentive-Fee was awarded on March 20, 1980, in the amount of $23,883,798. Another Cost-Plus-Incentive-Fee was awarded on May 1, 1980, in the amount of $8,100,285.

Although many firms were solicited, only one proposal was received on each procurement. The basis for awards placed primary emphasis on the technical area and secondary emphasis on the management area. Cost was third in importance and considered as a means of determining credibility and realism of the technical and management proposals.

Procedures followed during the course of negotiations included establishing Government objectives and discussions of the contractor's proposal by cost elements. However, the contracting officers ignored valid DCAA and administrative contracting officer questioned costs in determining their objectives as shown by the following examples.

Contract 1

The contracting officer's objective of $3,811,312 for the subcontract cost element was the same as the contractor's proposed costs. Consequently, he did not use about $140,000 questioned by both the Plant Representative and DCAA. A part of these questioned costs was $66,437 which represented an average 13.3 percent reduction that a subcontractor obtains from his vendors.

Contract 2

The Defense Contract Administration Service and DCAA both questioned $417,723 of the subcontract and purchase parts costs. However, the contracting officer again did not use any of these questioned costs in arriving at his objective.

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DOD CAN INCREASE ITS USE OF COMPETITION

Department of Defense (DOD) has made some progress toward increasing the use of competition, but there appears to be ample room for improvement.

The Use of Competition Can Be Increased

DOD's overall statistics for prime contract awards show that in FY 1981, competitive awards reached 40 percent while in 1980 competitive awards were 36 percent, an increase of 4 percent in the use of competition. A "rough order of magnitude" of the potential savings that may be achieved if DOD continues to make progress at the FY 1981 rate is shown below.

Estimated Savings That Could Be Achieved if Noncompetitive Procurements Were Competed

Total Defense noncompetitive procurement in FY 1981	$ 52.3 billion*
Percentage increased in FY 1981 if achieved in future years	.04
Estimated noncompetitive dollars that could be competed in future years	2.092 billion
"Rule of Thumb" 25 percent savings when noncompetitive awards are competed	$ 523 million

*Excludes intragovernmental transactions and awards to educational, nonprofit institutions, and utilities.

While DOD's overall statistics show progress is being made, this progress is not uniform. For example, the Air Force Logistics Command (AFLC) in a January 1981 letter, advised its five logistics centers that the FY 1980 competition goal of 32 percent had not been met. The command went on to point out that only 25.6 percent of contract dollars had been spent competitively. During FY 1981, AFLC's record for competition dropped to 25.2 percent.

AFLC also pointed out that the Small Business Administration (SBA) had in a number of instances successfully challenged Air Force decisions to award contracts on a sole-source basis. AFLC officials were concerned that SBA's success tended to highlight

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weaknesses in Air Force procurement and provided impetus for further criticism.

DOD Continues to Pay Higher Prices on Sole-Source Procurement

The following examples show how prices increase when sole-source procurement is used.

Instrument Panel Glare Shields

DOD had purchased instrument panel glare shields sole-source on eight occasions at a total cost of $79,103. In 1980, a small business submitted an unsolicited proposal 23 percent below the sole-source bid and received the contract. If the earlier sole-source purchases had been made at competitive prices, about $18,000 could have been saved.

Countermeasure Set

To promote competition on a planned July 1977 large quantity buy, a request for proposal (RFP) was issued to obtain a qualified second source using drawings obtained under a prior contract. Although this second source was the lower bidder on a subsequent procurement, its failure to deliver a qualified product caused it to be disqualified. However, it was permitted to continue to develop efforts so it could produce a qualified product.

In June 1981, another procurement was advertised. According to contracting officials the incumbent thought the second source would again be disqualified and offered a per unit price $10,000 higher than its previous unit price.

The contract negotiator believed the contract would have cost between $500,000 to $1,000,000 more if the incumbent contractor had been sole-source. However, the second source qualified and was awarded the contract. A direct comparison of the prices proposed by the incumbent and second source shows a savings of $253,970 or 18 percent of the contract price.

Test Bottles

Another example involves a sole-source contract awarded on September 4, 1980, for 270 test bottles at a unit price of $16. About 5 months later a competitive negotiated contract was awarded for 181 of the same item at a unit price of only $4.75. Four bidders responded to the later contract with the low bidder receiving the award. Had the latter contract been awarded at the lower price, about $3,000 could have been saved.

Engine Casings

DOD placed sole-source orders totaling $7,348,036 for engine casings over the last 5 years. During the period 1977

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through 1981, unit prices went from $4,325 to $17,018, a 293 percent increase. The largest single increase in price occurred on a 1979 order when the unit price was 35 percent higher than a price paid 3 months earlier. This increase was caused in part by an increase in labor hours which the contractor said was necessary because production was shifted from automated equipment to manual equipment. The contractor, therefore, increased his recovery of overhead and profit by changing to a less efficient method of production.

Impellers

A similar pattern occurred on another engine component. DOD, since 1979, awarded a series of sole-source orders totaling $1.2 million for an impeller. During the period, the unit price increased from $1,785 in May 1979 to $4,325 in December 1980, a 142 percent increase. An increase in labor hours played a major role in the price increase. After being advised by DCAA and DCAS, the contracting officer negotiated prices allowing 17.4 hours of manufacturing labor on the May 1979 buy and 27.5 hours on the December 1980 buy. The contract administrator assured the Investigative Staff that the contractor was using more labor to manufacture an item but could not explain why.

Noncompetitive conditions in the precision forging market also played a role in the price increase. The impeller (mentioned above) includes a titanium forging the contractor buys from a vendor. The cost allowed for this component increased about 157 percent between May 1979 and December 1980. Industry conditions are such that the relative handful of firms having the equipment and know how to fabricate precision forgings from exotic metals like titanium are swamped with business and, as a result, they are in the "driver's seat." The situation has caused ballooning of delivery leadtimes and rapidly escalating prices.

An unexpected leadtime increase for impellers caused the Air Force to pay "expedite fees" of $257,000. By 1981, the shortage of spare impellers was critical and the contractor agreed to increase the delivery rate from 15 to 25 per month if the Air Force paid a 25 percent "expedite fee" on top of the already inflated prices. DOD requested data to justify the fee, but the contractor did not provide it and offered to bill the Air Force at still higher commercial prices. However, the commercial prices are based on immediate "off-the-shelf" deliveries rather than the 18-month leadtimes agreed to by the Air Force. The contract administrator stated that since DOD has a critical need for the impeller and is locked into a sole-source procurement there is little choice but to pay the $257,000. He likened the situation to "negotiating with a gun at your head."

Component Breakout Programs
Not Effectively Implemented

DOD is not aggressively pursuing component breakout programs as an alternative to competitive procurement. Component breakout

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programs are intended to identify (1) sole-source items which are suitable for competitive procurement, and (2) sole-source items which can be procured directly from the actual manufacturer rather than through a prime contractor who is not the manufacturer.

The breakout program offers opportunities to reduce costs which are often lost. This results in increased costs amounting to millions of dollars.

Items for the A-10 Aircraft

Three selected A-10 items were procured sole-source at a total cost of $1,077,145 between February 1978 to February 1981. These items were coded for noncompetitive procurement because it was thought that adequate engineering data was not available.

Air Force was requested to rescreen these items to determine if a complete data package could be assembled after learning that the A-10 Systems Project Office (SPO) at Wright-Patterson Air Force Base had contracted with the prime contractor for a wide range of A-10 engineering data. This effort was completed in January 1982 and currently two of the three items are coded for competitive procurement.

The data ordered by the SPO was delivered to a repository at Wright-Patterson Air Force Base but the procurement office's efforts to acquire it for use in reprocurement was inadequate. There was no evidence in the procurement office's files that it had requested the repository to provide data for either of the samples. Had this been done, a substantial amount of the $1.1 million of procurement cost could have been competed. Details on the individual sample items are presented below.

Control Panel Assembly

Engineering drawings were delivered by the prime contractor to the repository on October 31, 1978. The item was screened in February 1979, but after finding that some but not all of the data was available in local files, the item was coded for sole-source procurement. There is no evidence of any attempt to get the missing drawings from the repository, other offices, or the contractor. In fact, some of the drawings listed as missing in the February 1979 screening were among the drawings which had to be requested from the repository when a rescreening was requested in August 1981.

Control panel procurements have been noncompetitive since the 1979 screening because the effort was not thorough. As of September 1981, five sole-source orders totaling $430,157 had been made and a sixth order was being prepared after a review of the contractor's $158,681 proposal. As a result of the rescreening the control panel is now coded for competitive procurement.

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Canopy Actuators

In June 1978, canopy actuators were screened and coded for sole-source procurement because complete data was not available. In February 1981, noncompetitive orders were placed with the prime contractor totaling $467,958. It cannot be said with certainty that this buy could have been made competitively, because of conflicting information about when the contractor delivered drawings. One source said the drawings were received in October 1980, well after the above buy was in progress. However, December 1979 correspondence from the prime contractor stated that the Air Force had the right to obtain actuators from any source and could do so by using the prime contractor's drawings. This tends to indicate the February 1981 buy could have been competitive.

In June 1981, the actuators were rescreened and coded for limited competition on the basis that complete data was still not available but there were now two known and approved sources. This was an improvement but it still was not full competition. In August 1981, the Investigative Staff asked that the item be rescreened. Subsequently, it was determined that between the prime contractor drawings and existing military specifications there is sufficient data to purchase the actuators from anyone. The items are now coded for full competition.

Jack Pads

In 1978 and 1979, this item was procured sole-source from the prime contractor on two occasions at a total cost of $82,582. The item was coded for noncompetitive procurement because drawings were not delivered to the repository until July 1980. It is important to note, however, that there was no evidence of any attempt to check wth the repository about the data. It is also significant that 1 year after delivery of the data to the repository, the item was still coded for sole-source procurement based upon the lack of data. This is because normal rescreening is done on a 3-year cycle, and there had not been any inquiry about the availability of data. At the Investigative Staff's request, the jack pad was rescreened and an engineering data package assembled. To maintain item quality, however, the jack pad will continue to be bought sole-source from the prime contractor unless new sources come forward and ask for approval of their products.

BLACK HAWK Helicopter

The Army has yet to begin any meaningful component breakout efforts on the BLACK HAWK helicopter system even though the system is entering the sixth year of production and about $127 million has been spent or committed for spares for FY's 1979-81. Although the Army's Aviation Research and Development Command (AVRADCOM) is responsible for initiating a breakout program, their plans are to start work on the program in March 1982. Since the inception of the program, the breakout effort for the BLACK HAWK has been

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shifted from the project managers office to AVRADCOM, then to the Troop Support and Aviation Materiel Readiness Command (TSARCOM) and back again to AVRADCOM. AVRADCOM now plans to start the entire BLACK HAWK breakout program over again using very little of the breakout effort that preceded the latest transfer. AVRADCOM officials generally concede that a breakout program on the BLACK HAWK should have begun much earlier but efforts were complicated by new approaches in programs of contractor supply support concept and warranties for the engine and airframe. Contractor supply support ends in April 1982 and the Army has been buying and storing parts for organic support since about December 1979.

An ongoing audit of DOD's breakout efforts by the Defense Audit Services (DAS) shows that the BLACK HAWK system is far behind in its breakout program. The DAS auditors reviewed 59 Blackhawk items and found that 17 items did not have adequate data packages to even begin breakout. According to DAS, the Government is paying for adequate packages but apparently is not getting them. DAS expects a draft report in February 1982.

KC-135 Replenishment Procurement

Review of the procurement method coding for a KC-135 ground lock procured sole-source from the prime contractor also disclosed deficiencies.

The aircraft ground lock provides an example of the breakout program working in reverse. For over 12 years, the lock was coded for competitive procurement and was bought in that manner on numerous occasions. However, in 1980, the lock was recoded for sole-source procurement and a noncompetitive contract was awarded to the prime contractor for $93,057.

This totally unnecessary action occurred because a screening technician erroneously believed the Air Force did not have rights to use the data in its possession for competitive procurement. The data, however, had been acquired from the prime contractor under a contract which expressly gave the Government rights to the data for reprocurement. The technician who coded the lock for noncompetitive procurement was apparently unaware of the above contract arrangements. The lock has now been recoded for competitive procurement.

B-52 Replenishment Procurement

Twelve selected B-52 items were procured sole-source from the prime contractor at a total cost of $688,233 between 1976 and August 1981.

Four items were coded 3P indicating that noncompetitive procurement was necessary because engineering data was legally unavailable (proprietary) and could not be acquired by purchase. However, it was determined that in an April 1975 message the

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prime contractor advised that, "* * * proprietary data rights to B-52 model airplane drawings has been relinquished to the Government." Two of the four items had been rescreened after the 1975 message and nevertheless, assigned code 3P. Personnel said that after receipt of the message they did not immediately and systematically remove the restrictive markings from all B-52 drawings and those markings were never removed from some drawings. The other 3P items had not been rescreened since the 1975 message even though rescreening is supposed to occur on a 3-year cycle. Personnel said it was local policy not to rescreen 3P items unless there is reason to believe the proprietary status of the data has changed. These personnel could not explain why some screening technicians were apparently unaware of the 1975 message.

Two of the 12 B-52 items were coded 3C which means procurement can only be made from an approved source so quality of the item is maintained. The prime contractor was the only approved source. However, no action had been taken to remove restrictive markings from drawings or to make drawings available to other potential suppliers who may have been interested in becoming approved sources.

Five of 12 items were coded 3H which indicates the Government does not have sufficient, accurate, or legible data to purchase this item from other sources. The 3H code is assigned temporarily while efforts are made to (1) obtain data from other Government organizations or the prime contractor, or (2) draft specifications suitable for procurement. In three of five cases, no evidence was found of any attempt to acquire data after determining it was unavailable locally. In the remaining two cases, an unsuccessful attempt was made to get data from the repository at Wright-Patterson, but there had not been any attempts to get the data from other sources or to develop it in-house.

One B-52 item, described as a "Gauge Assembly, Body Tanks," was coded 3Q which indicates exceptional unique manufacturing processes or materials are required to produce the item. The engineer who assigned the code said he thought the item was a part of the fuel gauging system onboard the aircraft and it is his practice to code all such components 3Q. After it was pointed out the item was really just a tubular aluminum dip stick used by ground personnel to measure fuel in the body tanks, the engineer said the item could be recorded for competitive procurement if legible drawings could be located. The existing drawings were partially illegible.

A rescreening of the 12 B-52 items was requested in September 1981 but as of mid-January 1982 only five had been completed. Two of the five were recoded for competitive procurement, but three items remain noncompetitive even though complete data packages with unlimited rights are now available.

Personnel explained that two items remain sole source because engineering source approval is required to maintain

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quality and the prime contractor is currently the only approved source. Even though the annual buy value of the two items is over $100,000, there is no intention to make any effort to develop additional sources. Thus, the only possibility of getting competition lies in the chance that some other contractor will become aware the items are being bought and will of his own initiative submit an unsolicited proposal and attempt to get his product approved. It was noted these items have been bought for at least 4 years and no new sources have been identified. It seems that the chance of developing competition would be greatly improved if new sources were identified.

The third item which remained sole source after the rescreening is, according to personnel, probably not actually manufactured by the prime. However, personnel said that the quality of this item must be maintained and that the prime probably performs, "some sort of test or inspection" on the items after acquiring them from subcontractors. When questioned further, the personnel said they did not know for a fact that the prime performed any quality assurance role. The regulation establishing the breakout program warns that "in some cases quality control, supposedly exercised by a prime contractor on vendor items, has in fact been negligible."

After 4 months the rescreening of 7 out of 12 B-52 sample items has not been completed which would indicate the process as currently configured is time-consuming and cumbersome. If it takes that long to rescreen a few items on a "special project" basis, it is not surprising that earlier routine screenings of the sample items were superficial and ineffective.

Senior Air Force personnel said the problems enumerated above were the result of a very high workload and too few people to accomplish it. They also acknowledged that screening procedures need to be improved and streamlined. To illustrate, they pointed out that several requests to the data repository are often necessary to assemble a complete reprocurement data package for a single item. This occurs because the "top drawing" initially requested may reference other drawings which must be requested. The second set of drawings may reference still others and so on. To further compound the problem, it routinely takes up to 30 days to get a reply from the repository once a request is made. Thus, it may take 90 days to assemble a complete data package if three levels of drawings are needed.

An October 1980 General Accounting Office (GAO) report indicates it also found ineffective data assembly procedures at another DOD procurement activity. GAO's work disclosed that the intermittent, piecemeal process for assembling reprocurement data packages often extends over long periods during which a number of noncompetitive purchases occur. To illustrate, GAO cited the example of one part which in April 1975 was coded for noncompetitive procurement because of insufficient data. Between that date and March 1979, about $1.6 million was spent

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on seven noncompetitive purchases for the part. According to the records, it was not until May 1979 that reprocurement data was requested from the manufacturer. The report concluded that timely action was not being taken to increase competition on high dollar value replenishment spare parts purchases.

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Report of February 17, 1982

OVERSTATED AIR FORCE REQUIREMENTS FOR STOCK FUND ITEMS INCREASE DOD OPERATING COSTS

The Air Force system for estimating expendable spares needs tends to overstate requirements, resulting in larger than required inventories and increased operating costs.

DOD issues overall policy guidance to the services for determining secondary spare parts requirements. However, the individual services have considerable flexibility and latitude for implementing the guidance, setting requirements priorities, and determining how requirements will be met. In the Army, the requirements determination process is primarily the responsibility of the various readiness commands. In the Air Force, this responsibility rests with the Air Force Logistics Command and the five air logistics centers, and in the Navy, this responsibility rests with the Aviation Supply Office and Ships Parts Control Center.

The Army, Navy, and Air Force spend billions of dollars for replenishment and repair of secondary items to meet operating requirements, as shown in the following table.

Planned Procurement and Repair of Secondary Items--FY 1981

Service	Planned Procurement	Planned Repair	Total
	millions		
Army	$1,414.2	$ 330.0	$1,744.2
Navy	2,415.0	755.7	3,170.7
Air Force	2,638.5	1,069.7	3,708.2
Total	$6,467.7	$2,155.4	$8,623.1

Improper decisions can quickly lead to unneeded items being bought or equipment needed for U.S. defense being deadlined for lack of parts. In either case, resources are not optimally utilized. Thus, the objective of good inventory management is to buy the proper items, in the proper amounts and at the proper time, so that the items will be available when needed while also minimizing investment costs.

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Air Force Overstated Requirements
Increase Operating Costs

The Air Force finances expendable spare parts for aircraft, weapon systems, and supporting equipment through the System Support Division of its stock fund. These items are characterized as low dollar value items, but an essential feature is that they cannot feasibly be repaired when they fail. Items such as transformers, sensors, and gearshifts which can cost over $1,000 a piece are included in this category.

The Air Force's investment in expendable spare parts is significant. As of the end of FY 1981, the San Antonio ALC had about $800 million worth of stocks on hand, $531 million undelivered items on contracts, and about $228 million committed on approved purchase requests for a total of $1.6 billion. The ALC computed a total requirement for expendable spares of about $1.5 billion. While the total on-hand and on order exceeded the requirements objective, the ALC had far too few of some items and far too many of others. Commitments on shortage items fell short of established reorder levels by about $179 million!

A Computer System Computes
Stock Fund Requirements

The Air Force relies heavily on automated data processing methods to determine requirements for expendable spare parts. A computer system data base contains identifying and management data on each individual item. Periodically, the automated supply system updates the data base with recent information on issues and on-hand balances. Similarly, an automated procurement tracking system provides data on expected contract deliveries and delivery leadtimes. Additional, or corrected data can be manually added to the data base by individual inventory managers. The requirements system, in turn, periodically reviews the information in the data base, and informs inventory managers of items for which a buy, or cancellation of outstanding contracts is indicated.

Historical usage rates are the starting point in the requirements determination process. Based on data obtained from the supply system, the requirements system computes an average monthly usage rate. Considering delivery leadtime information in the data base, the requirements system estimates how many units of an item will be needed during the period from initiation of a purchase request until delivery of items under the resulting contract. This quantity, plus stocks to cover certain other requirements, is established as the reorder level for the item.

The requirements in addition to units needed during the acquisition leadtime included in establishing an item's reorder level are as follows:

-- A level of safety stocks intended to prevent unanticipated fluctuations in demand from exhausting supplies.

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-- A depot supply level to cover the stocks needed by depot repair activities.

-- Stocks to fill any requisitions currently on backorder, except for low priority depot supply requisitions.

-- The funded portion of war reserve material requirements.

When the total of stocks on hand and anticipated deliveries on existing contracts for an item is equal to or less than the item's reorder level, the requirements system notifies the appropriate inventory manager that the purchase of additional stocks should be considered. The system also computes an economic order quantity, designed to balance the administrative cost of processing and placing an order for more supplies against the costs of financing and storing additional inventory. The computed order quantity can range from 6 months to 3 years expected usage. In general, as the cost of supplies expected to be used during a year increases, the period of time covered by the computed order quantity will be shorter.

Inventories maintained to cover usage during the acquisition leadtime represent the largest fraction of the stock fund requirements objective, as shown by the following table.

SIZE OF VARIOUS SEGMENTS OF STOCK FUND REQUIREMENTS OBJECTIVE--SAN ANTONIO ALC AS OF OCTOBER 1, 1981

Requirement Segment	Dollar Value (In Millions)	Percent of Requirements Objective
Safety level stocks	$ 60.459	4.0%
Insurance stocks*	31.473	2.1
Depot supply stocks	34.475	2.3
Stock due out	94.597	6.3
War reserve stocks	21.725	1.4
Acquisition leadtime stocks	899.540	59.6
Economic order quantity	366.356	24.3
Total Requirements Objective	$1,508.625	100.0%

*Stocks of items not subject to wearout and used so infrequently that requirements are based on a numerical stockage objective rather than estimated from past usage.

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Managing Supplies That Exceed the Requirement Objective

In a predictable world, the total of on hand stocks and anticipated contract deliveries for an item would fluctuate between the item's reorder level and the requirements objective. Unexpected changes in demand, delays in vendor deliveries, and other vagaries of the real world can cause the balance of available assets to be more or less than this ideal range.

To provide guidelines for managing quantities of available assets that exceed this ideal range, the services have defined three further requirements levels: the termination level, the approved force acquisition objective, and the retention level. These requirements levels are discussed below.

-- Termination level: This level is equal to the requirements objective plus 6 months expected usage. When available assets reach this level any outstanding contracts for items exceeding the requirements objective should be considered for termination.

-- Approved Force Acquisition Objective: This level is equal to the reorder level, between 2 and 4 years expected usage and all war reserve material requirements. Quantities of items in excess of this level are classified as "long supplies" and using activities returning items to the supply system in excess of this level receive no credit for the items returned.

-- Retention level: This level is equal to the Approved Force Acquisition Objective plus 5 years expected usage. Quantities of items exceeding this level are classified as "excess stocks" and should be considered for disposition.

Air Force Requirements Are Inflated

Several features of the Air Force's system for determining expendable spare parts needs tend to produce overstated requirements. As we noted above, the requirements determination process begins with an estimate of spares usage. The Air Force's procedure for estimating usage:

-- Applies adjustment factors to historical spares demand for selected weapon systems that are not borne out by experience.

-- Ignores known offsets to historical demand for certain categories of low value spares.

-- Overreacts to initial demands for new items.

Since the various requirements segments are determined based on overestimated future usage, the Air Force tends to stock more spares than are actually needed as noted below.

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While evaluating expendable spares requirements determination, pertinent regulations and guidance relating to the requirements computation system and aggregate statistics on stock fund item requirements were reviewed and analyzed. In addition, the detailed information on randomly selected samples of spares used on the F-16 aircraft and the F-100 jet engine were gathered and analyzed. The F-16 item sample included 26 of the 1,776 F-16 items managed at the San Antonio ALC; the F-100 sample was 77 of 7,436 items. Items with an estimated annual usage of $500 or less were excluded from the sample. While such items represent about 80 percent of all the items stocked at San Antonio ALC, they account for only about 17 percent of total Air Force requirements.

It was determined that the Air Force's requirements determination process has not worked well. Despite critical shortages of selected spares that have contributed to reduced mission readiness, many spare parts are, according to requirements system computations, in a "long supply" position. About 42 percent of the F-16 aircraft sample items and about 32 percent of the F-100 engine sample of spares were in a long supply status. The long supply segment of inventories represented about 6 percent of total inventory investment for the F-16 aircraft sample items and about 11 percent of total investment for the F-100 engine sample items. It should be noted that stocks must exceed established reorder levels by 2 to 4 years usage and satisfy all war reserve requirements before they are considered to be in long supply.

Unvalidated Adjustment Factors
Contribute to Inflated Requirements

Use of changing adjustment factors that are not related to actual demand trends in estimating future usage is one factor contributing to bloated stock levels. Instances were noted in which changed adjustment factors applied to an essentially stable demand pattern directly caused acquisitions of "long supply" stocks. Further, analysis of demand patterns for sample items indicates that computed requirements for F-100 engine spares may be overstated by as much as $8.3 million!

In projecting future needs, the Air Force requirements system multiplies average demands by an adjustment factor known as a "program ratio" to arrive at an expected monthly usage rate. This program ratio can be either greater or less than 100 percent. The ratio is intended to adjust for increasing spares demand due to new aircraft being put into service, and increased flying programs, as well as decreasing usage for systems that are being phased out. For example, the program ratio for F-16 aircraft spares is 279.9 percent while the ratio for B-57 aircraft items is 48.7 percent. Items used on a variety of aircraft, or on systems with no clear trend in program, have a program ratio of 100 percent, which produces no adjustment in average historical demand.

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The Air Force derives these program ratios by comparing past and projected flying programs for each aircraft type. AFLC does not, however, compare trends in flying programs to trends in spares usage. Studies performed by AFLC some years ago showed that there is no consistent relationship between flying programs and spares usage, and that use of a program ratio did not consistently improve supply support or help minimize support costs.

Changes in the program ratio that are not related to changes in actual usage can result in unnecessary purchases. The following table shows the average usage and requirements computed by the Air Force system for one item, a harness used on the F-16 aircraft.

COMPUTED REQUIREMENTS FOR HARNESS
USED ON THE F-16 AIRCRAFT

Date	Average Past Monthly Usage	Program Ratio	Projected Future Monthly Usage	Supply Action Recommended by System
1/31/81 ---	.52/mo	336.7%	1.75/mo	Buy 40
3/31/81 ---	.63/mo	346.2%	2.18/mo	Buy 22
6/31/81 ---	.56/mo	313.1%	1.75/mo	Terminate 6
9/15/81 ---	.53/mo	279.9%	1.48/mo	Terminate 15

Actual usage of the item has fluctuated within a narrow range, but changes in the program ratio served to magnify these fluctuations. From a shortage position, the item has moved to a long supply position, with 15 units subject to termination on order at a cost of $4,257.15.

Differences between actual demand patterns on our samples of F-16 aircraft and F-100 engine items and the program ratios applicable to these systems indicate that the Air Force's computed requirements are overstated. To test the effect of program ratio adjustments on supply status, simulated demand records for a hypothetical item with demands increasing at a rate of 50 percent annually were constructed. Standard Air Force requirements formulas were applied to the simulated demand records using a program ratio of 150 percent. It was found that if orders for additional stocks were placed as indicated by the requirements formulas, the 150 percent program ratio adequately adjusted for demand increases, and no "out-of-stock" conditions occurred.

The program ratios applied in projecting future usage for the F-16 aircraft and F-100 engine spare parts indicate that the Air Force anticipates a surging growth in demand. One hundred percent represents an expectation of no growth above past experience.

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For example, if an average quarterly demand was 100 and the program ratio for 8/81- was used, the computation would reflect an estimated future usage of 280 (279.9 rounded) which is then used in the requirements computation.

	Program Ratio	
	Spares	Accessory Spares
Periods	F-16 Aircraft	F-100 Engine
5/80-8/80 ----	309.9%	208.0%
8/80-11/80 ----	395.6	208.0
11/80-3/81 ----	336.7	208.0
3/81-6/81 ----	346.2	208.0
6/81-8/81 ----	313.1	140.4
8/81- ----	279.9	140.9
Range Above Quarterly Demand	179.9 - 295.6%	40.9 - 108%

Since a special procedure is used to compute requirements for components of the F-100 engine proper, the F-100 engine program ratio is applicable only to engine accessory items.

Actual changes in demand for these groups of spares have not followed a regular pattern, but have not been as great as implied by specified program ratios. The following table depicts the 2 years of demand history carried in the requirements system data base for the various categories of items examined. The actual demand figures for each quarter have been converted to a common unit so that a figure of 100 percent for a quarter represents actual usage and is equal to the average quarterly usage for the 2-year period.

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PERCENTAGE OF DEMAND CHANGES FOR
SPARE PARTS USED ON SELECTED SYSTEMS

Period	F-16 Aircraft Spares	F-100 Engine Accessory Spares	F-100 Engine Spares
FY79, 4th Qtr. --	86.75%	*	*
FY80, 1st Qtr. --	45.67	91.65%	03.39%
FY80, 2nd Qtr. --	05.24	96.57	94.89
FY80, 3rd Qtr. --	35.62	19.66	87.33
FY80, 4th Qtr. --	91.59	96.30	07.16
FY81, 1st Qtr. --	75.14	91.05	64.36
FY81, 2nd Qtr. --	23.05	99.94	49.76
FY81, 3rd Qtr. --	36.96	08.68	08.10
FY81, 4th Qtr. --	*	01.87	84.92
Percent Change:			
1st 4 Quarters vs. 2nd. 4 Quarters -	+92.7%	-0.7%	+3.7%

*Data not available--data on the two systems were gathered at different times.

As can be seen from the table, the demand pattern on average for F-100 engine accessory items has been essentially stable rather than exhibiting the 40 to 108 percent growth rates implied by the specified program ratios. If this holds true in the future, there is no need for the adjustment to past demand effected by the current 140.9 percent program ratio for the items. Reducing the program ratio to the standard 100 percent could reduce the requirement for stock to cover acquisition leadtime usage by as much as $8.3 million.

Since there are already plenty of some items on hand, this reduction in requirements would, of course, not translate directly into current procurement dollar savings.

Offsets to Demand Inflates
Requirement Levels

It was noted that the Air Force requirements system does not consider certain data on offsets to past usage in projecting requirements. The system is designed to manage costly, high demand items differently from low demand items. For the low demand categories, the system projects usage based on gross rather than net demand. Use of gross demand has caused unnecessary spares purchases, and may have resulted in a $11.7 million overstatement of requirements.

The Air Force manages different classes of expendable spares differently, based on the value of anticipated annual usage.

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Items are divided into four categories, ranging from those with under $500 usage a year to those with over $50,000. The system computes requirements levels for "under $500" items only once a month, and for "over $50,000" items four times monthly. Regulations instruct inventory managers to minimize reviews of systems data for "under $500" items while subjecting data on "over $50,000" items to intensive review and validation. The system also uses slightly different formulas to project requirements for the different categories.

One difference involves treatment of offsets to demand. The usage history data base distinguishes between recurring and nonrecurring demand, and includes information on items field activities have returned to the supply system. The system projects future usage for the two higher value classes having annual demand of over $5,000 based on past usage net of nonrecurring demands and returns. For the lower-value classes, future usage is estimated from gross demand.

Use of gross demand can cause wasteful expenditures. For example, a March 1979 requirements computation resulted in San Antonio ALC contracting for 110 aircraft ground locks at a cost of $93,056.70. Since the item had last been purchased in 1973, the requirements system, relying on outdated price information, treated the item as a "low value" spare, and computed requirements based on gross demand. Analysis of the requirements situation indicates that had net demand, equal to about half of gross demand, been used to compute requirements, the contract would never have been awarded. Later in September 1981, the requirements system produced a termination notice that led the inventory manager to try to cancel the contract. The contractor, however, indicated that the supplies were ready for shipment and the unnecessary $93,000 expenditure could not be avoided.

Use of gross demand can also perpetuate errors made by supply clerks. For example, the maintenance activity at Kelly AFB ordered some caps used on the F-16 aircraft early in 1981. Based on this order, the requirements system identified a need to buy 44 of the caps, and the inventory manager initiated contracting action. Shortly thereafter, Kelly maintenance returned the caps, since Kelly does not work on F-16's. This erroneous order is the only demand recorded for the item, but the requirements system, using gross demand to project future usage, still indicates a demand based requirement for the caps.

Requirement System Procedures on Initial Usage Causes Unneeded Buys

The Air Force requirements system tends to give too much weight to first time demands for new items, generating inflated requirements estimates. This emphasis in the requirements formula has caused the purchase of excess stock. It is difficult to estimate the overall impact of this procedure, but requirements for new items are significant.

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While the Air Force requirements system is geared to projecting future usage from 2 years of history, new types of spare parts will not have been in stock for 2 years. In order to formulate an estimate of future usage, the system averages initial requisitions from using activities over a 6-month period to arrive at a monthly usage rate. Over time, the system increases this averaging period as more demand history becomes available; but an item may have been in stock for some time before users begin placing orders. The system considers only the period since users began to order an item, rather than the full period an item has been in stock, in figuring a monthly usage rate.

Not considering how long an item has been in stock can lead to unnecessary purchases. For example, one cable assembly used on the F-16 aircraft, was brought into the supply system in February 1978. No users needed a spare cable assembly, however, until May 1980, when Eglin AFB ordered one. Assuming that this activity took place in a 6-month period rather than a 2-year period as was in fact the case, the requirements system indicated to the inventory manager that 19 units should be purchased.

The system came to an erroneous conclusion. Acting on its recommendation, the inventory manager placed an order for 19 cable assemblies costing $7,870.94. No other users have ordered cable assemblies since May 1980, and the requirements system currently indicates that excess assemblies are on order. Had the full 2-year history of the item been considered at the time the initial demand was received, only four assemblies would have been purchased with a possible 79 percent reduction in expenditures.

About 46 percent of the F-16 aircraft sample items examined had less than 2 years of history, and these items had, on average, been in stock for 13 months before users started requisitioning them. In contrast, only about 9 percent of the F-100 engine sample items had less than 2 years of history, but these items had been in stock for 21 months before a need for them arose.

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Report of February 17, 1982

THE LEADER/FOLLOWER PROCUREMENT OF THE AN/AYK-14(V)

Navy rationale supporting its reasons for second sourcing the AYK-14, that is, competition and establishment of a mobilization base, does not contain sufficient substance to justify the expenditure of the $22 to $35 million required to establish a second source.

Background

In 1976 the Navy began development of a standard airborne general purpose digital processor as an interim solution to the proliferation of unique tactical airborne computers throughout the Navy. It was intended that this development be the Navy Standard Airborne Computer until 1990 when the Navy plans to adopt the Department of Defense (DOD) standards currently being developed for all tactical embedded computer (TEC) systems. The resulting computer system, the AN/AYK-14(V), is not actually a standard computer. It is a family of standard modules which may be variably configured to satisfy the needs of many applications, from one system which may require only three modules to one which may require 18 or more modules in a standard air transportable rack (ATR) configuration. By mandating that the AYK-14 emulate the AN/UYK-20, or Navy standard Instruction Set Architecture, the Navy was attempting to capitalize on its $20 million investment in software documentation. The additional requirement of standardized hardware, or modules, addressed the problems of Navy shipboard logistics.

At the outset the Navy envisioned a parallel development by two sources but was limited by funding to competition for a single developer. Therefore, the Navy required the developer to produce a Technical Data Package so that a second source could build to print (blueprints and specifications) when development was complete.

Program Growth

Initially, the AYK-14 program was driven by its anticipated use in the concurrently developing F/A-18, and the Light Airborne Multi-Purpose System (LAMPS) helicopter. At that time, the Navy envisioned the need for approximately $20 million in Research, Development, Test, and Engineering (RDT&E) funds and approximately $200 million in procurement funds. Within several years, as many as 32 potential users were considering embedding up to 27 configurations of the AYK-14 family in their systems. This increased the size of the program to an anticipated $70 million in RDT&E and up to $1.5 billion in procurement. In addition, this surge in requirements fostered extensive schedule slippages due to the continuous addition and deletion of users and their, at least partially, unique requirements. Since many of the using systems were in development stages, their specific needs also were subject to change. In fact, the F/A-18 requirements changed so substantially that the first computer designed for

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its use had to be replaced by two larger configurations of AYK-14 computers.

Leader/Follower Evolution

After development was complete in December 1979, the Navy still hoped to introduce a second producer to realize the benefits of competition and to establish a mobilization base. However, it was informed that validation of the AYK-14 Technical Data Package, a necessity for a second source to build to print would take 2 years and cost $2.5 million. In addition to what the Navy considered to be unaffordable investments in time and money, it believed the sophisticated AYK-14 could not be built to print without extensive assistance from the developer and sole producer, the Control Data Corporation (CDC).

Leader/Follower procurement is a method under which the developer or sole producer (leader) of an item furnishes assistance to a follower company which enables that follower to become a source of supply for the item. This procurement method was initiated for the AYK-14 since it seemed to be the best way to not only ensure CDC's assistance to the second source, but it also provided for quasi-validation of the Technical Data Package through the qualification of the second source.

Leader/Follower Concerns

In March 1981, the Navy contracted with CDC to develop a Leader/Follower Program Plan and a Request for Proposal (RFP) for competitive selection of a follower. This contract included an option for CDC to select the follower with the Navy's advice and consent. CDC agreed to this request with the proviso that its wholly owned subsidiary, Computing Devices, Ltd., of Canada (COMDEV) be allowed to compete as a potential follower. The Navy's acceptance of the proviso was contingent upon it being legal and proper.

In addition to the unusual circumstances cited above, the Canadian Government is currently considering a COMDEV request for approximately $11.8 million (U.S.) in assistance if it becomes the second source for the AYK-14. Of this amount, only 25 to 30 percent would have to be paid back to the Canadian government, leaving a net subsidy of approximately $8.2 million (U.S.).

The possible implications of these factors are of concern to Congress, the computer industry, the Navy, and even CDC. They include conflict of interest, unfair competitive advantage to COMDEV through its relationship with CDC and its possible subsidy from the Canadian government, the extent of eventual true competition, and the ability of CDC to successfully bring a second source other than COMDEV on board.

In fact, conferees of the Committees on Armed Services of the Senate and House of Representatives predicated their approval of

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$13 million of a requested $15.044 million for Navy Avionics Development, including a requested $7 million for product improvement of the AYK-14 and qualification of a second source for computer production, on the following:

> "The Office of the Secretary of Defense advises the Committees on Armed Services of the Senate and House of Representatives that a cost and performance comparison of the AYK-14 and the Air Force standard military computer has been completed and that a requirement exists to procure both systems.
>
> "If the requirement for discrete systems can be demonstrated, the Navy, with assistance of the prime contractor, shall select and qualify a second source for AYK-14 production.
>
> "Product Improvement of the AYK-14 be deferred until a second source has been selected and the Navy advises the Committees on Armed Services of the Senate and House of Representatives in writing that both the prime contractor and second source will be capable of incorporating enhanced capability into the baseline and product improved computers."

The Navy General Counsel's Office in addressing these concerns in conjunction with the Defense Contract Administration Services Management Area (DCASMA), Defense Logistics Agency, St. Paul, Minnesota, has established legal requisites which it believes produce evidence of and insurance of COMDEV's independence from its American parent company in all matters relating to the second sourcing of the AYK-14. To date, it has found no procedural or legal objections to COMDEV's participation in the competition and has referred the matter to the General Accounting Office for advance opinion and comment.

The possible Canadian subsidy available to COMDEV obviously gives COMDEV a competitive advantage, but changes to this situation are beyond the purview of the Navy.

CDC believes it's possible, but extremely difficult, to assist a second source in building to print. CDC representatives believe success will be largely determined by the degree of cooperation and coordination attained by the two participants.

Second Source Justifications

Since adding a second source to the AYK-14 program is based primarily on competition and mobilization base planning, these concepts should not blithely be accepted, as they frequently are, for their inherent "goodness."

Competition should ensure that the Government receives its contractual products and services at the lowest cost. Further, establishment of a mobilization base contributes to program

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stability. However, the credibility of a mobilization base is undermined when it includes first and second tier suppliers that are the sole producers of critical components. In such cases, it is merely a facade.

Competition

Savings due to potential competition using the Leader/Follower technique can only be estimated since it's difficult to differentiate between price reductions due to learning curve improvements and those associated with the competitive environment although various studies indicate a range of 5 to 25 percent savings is possible. Savings are dependent upon many variables including the length of the program remaining after the introduction of competition, the investment required to initiate competition, and the accuracy of program estimates. In the AYK-14 program the anticipated savings are highly dependent upon these factors.

Since the AYK-14 is Government furnished equipment on all user systems, projections of its production quantities are totally dependent on the forecasts for these user systems. Although the current and projected major users of the AYK-14 are the F/A-18, LAMPS and the Advanced Light Weight Torpedo (ALWT), respectively, the ALWT is still in research and development. Of the remaining 12 potential users, 9 are also in research and development and 1 of these currently is being held in abeyance. The potential for program cancellations, schedule stretchouts and slippages, as well as reductions in program requirements puts the reliability of these forecasts in serious doubt. In fact, the 2 year AYK-14 schedule slippage did not seriously impact the users because of simultaneous schedule slippage in user programs.

The Navy believes a second source can be fully on-board by the end of 1985, whereas CDC believes that 1986 is more probable due to the extreme difficulty of building to print. Any significant slippage in these forecasts moves full second sourcing to the 1986-87 time frame with only 3-4 years remaining in the program.

CDC has verbally furnished the Navy and the Investigative Staff with rough estimates of the cost to fully implement second sourcing. Although the details supporting these figures are vague, the Navy believes they could be lower.

While the Navy's budget plans include $24 million for the second sourcing process, CDC estimates the establishment of a second source other than COMDEV will cost $12 to $13 million for CDC's participation and $18 to $22 million for the second source's participation. If the second source is COMDEV, CDC believes these estimates would become $10 to $15 million for CDC's participation and $12 to $15 million for COMDEV's participation. These figures include work already done by CDC, further RFP development, bid evaluation, selection assistance, transfer of technology, tooling for the second source, pilot production, and learning

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buys. They also include the assumption that the second source would be an experienced computer manufacturer.

The variations in these estimates are based primarily on management variables which would be greatly facilitated by COMDEV's relationship to CDC. These include the ability to coordinate technology improvements expeditiously, the second source's ability to read and interpret CDC prints, the duplication and verification of CDC's drawings, the ability of the second source to assimilate CDC procedures, and the resolution of "our way versus your way" debates. The potential for increased cost in CDC's effort if COMDEV becomes the second source recognizes the possibility that the Canadian government may require extensive accounting and/or procedural documentation which will not be needed if a United States firm becomes the second source.

Based on rough Navy planning estimates, calculations involving the above variables indicate potential savings in the tens of millions of dollars. These calculations assume:

(a) Fifteen percent plus price savings due to competition.

(b) User requirements remain stable at approximately $160 million per year.

(c) The second source can be fully production capable 3 years from contract award.

(d) Second sourcing costs as estimated above by CDC are $35 million or less.

Since the Navy could not furnish firm projections of its anticipated savings, the Investigative Staff used these Navy assumptions to calculate a 15 percent competitive price reduction over the remaining 5 years of production after the introduction of full competition. This calculation yields approximately $120 million minus the $24 to $35 million in second sourcing costs for a total savings of $85 to $96 million.

Based on past program experience, 2 years of schedule slippage and significant cost growth (approximately $17 million), there is little reason to believe that further slippage and cost growth will not occur. It further appears that maximization of competitive price reductions is in doubt due to the limited years of production after second sourcing. The stability of user requirements, especially toward the end of the program as this technology becomes older and more costly relative to newer technology is also questionable.

Any significant, but not unlikely, deterioration in Navy estimates will have a seriously deleterious effect on potential competitive advantages or even possibly result in program cost growth.

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Mobilization Base Planning

Establishment of a mobilization base, the other primary reason for second sourcing, has also been a Navy consideration since the beginning of the program. The Production Management Division of the Naval Air Systems Command (NAVAIR) is the office responsible for mobilization base planning analysis for the AYK-14. Official analyses based only on actual production requirements, as opposed to projected requirements for systems still in development, do not currently support two sources for the AYK-14. However, at the request of the AYK-14 program office, it has recommended the establishment of two sources based on the latest 5 year defense program projections which include systems in development and CDC's current production capacity of 35 per month. Here again the question should be asked, "Is the Navy attaining a true mobilization base or merely the appearance of one?" Although the Navy abandoned dual development of the AYK-14 due to the lack of funds, they initially mandated dual procurement of four of its critical components, the core memory modules, microelectronic devices, connectors, and power supplies.

CDC maintains two core memory suppliers. Both, however, have their memories produced off-shore, one in Taiwan and one in Hong Kong, since domestic production does not exist. CDC estimated a 6-month lead-time for replacing this off-shore source with U.S. capability. Likewise, one supplier in Japan is the sole source of the U.S. computer industry's needs for ceramic flatpacks, microelectronic devices primarily used in military applications. Again CDC estimates a 6-month lead-time to substitute U.S. production for this sole off-shore source. The second source requirement for another specified critical item, a connector, was waived when the Navy found it would have to invest $100,000 in tooling for the second source. Similarly, a contract to design and build a second power supply was terminated after an expenditure of $600,000 to $700,000 because the vendor could not produce a satisfactory unit. The subsequent attempt to solicit bids for building CDC's power supply to print was also scrapped.

Although the second sourcing of the AYK-14 would create the appearance of a mobilization base, it should be questioned whether it would be a true mobilization base in view of this second tier off-shore and single sourcing of critical components.

Overview of Proposed Procurement

The Navy rationale supporting its primary reasons for second sourcing the AYK-14, competition and establishment of a mobilization base, does not contain sufficient substance to justify the expenditure of $22 to $35 million. In addition, the introduction of a second source could force the Navy to continue the AYK-14 program beyond what would otherwise be a timely termination in an effort to realize the forecasted savings.

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A viable and much less costly option could be exercised by increasing CDC's production capability to 100 per month (total projected program requirements) at an estimated cost to the Government of $3.3 to $3.8 million. This alternative has an added advantage of being able to absorb significant decreases in requirements since CDC's estimate of a minimum sustaining production rate is only 30 to 40 per month. It, also, would minimize the impact of foreshortening the AYK-14 program due to technology improvements or implementation of interservice tactical embedded computer programs.

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IX. ADDITIONAL MEMORANDA TO THE CHAIRMAN

Between February 17, 1982, and May 18, 1982, nine additional memoranda have been submitted to the Chairman on topics within the purview of the Committee directive. Four were updates of issues previously reported upon and are included in the appropriate sections of this report. The remaining five memoranda which involve issues not previously reported on, are presented in the following section of this report.

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Report of April 13, 1982

EXTERNAL NOZZLE SEGMENTS
F100PW100 ENGINE AUGMENTER SECTION

The Investigative Staff has been conducting a continuing review of the provisioning processes of the military departments within the DOD. In this context, a situation of interest at the San Antonio Air Logistics Center (SAALC) involving F-15 spare parts has been developed. This matter is believed significant, not only from the standpoint of the obvious procurement system shortfalls which it graphically details, but also due to the negative readiness impact that may result from the expenditure of limited O&M funds on spare parts that are already in excess supply.

At issue in this matter are the external nozzle segments--commonly called turkey feathers--which were formerly a part of the F100PW100 engine augmenter section on the F-15 aircraft. From the onset of the F-15 program, these items proved to be a logistics support nightmare and, consequently, in December 1980, the Air Force Aeronautical Systems Division (ASD) decided they were unnecessary and should be removed.

Prior to this decision, however, the Air Force had spent approximately $42 million to buy spare segments and undetermined millions to repair broken ones. Because they are no longer used on the F-15, about 17,000 of these items currently in inventory, or due in from contract, are classified as excess to needs. Based on the current list price, these excess assets are valued at approximately $25 million. A chronology setting forth the events which led up to this situation follows.

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According to San Antonio Air Logistics Center (SAALC) personnel, the nozzle segments used on the F-15 were simply not supportable. They had a very low mean time between failure, and production of new spares and repair of unserviceables could not keep pace with demands. As a result, they were continually in a critical supply position from 1976 until their removal in late 1980. Shortages of this part resulted in about 25,000 mission incapability (MICAP) hours per month.

The nozzle segment support cost and the reduced readiness status of the aircraft equipped with these segments ultimately led to tests to determine if F-15's could fly without them. The Aeronautical System Division (ASD) at Wright-Patterson Air Force Base was concerned that the removal of the segments would reduce performance and durability and would change the infrared signature, making the aircraft more vulnerable to heat-seeking missiles. Tests to resolve these concerns began in February 1979 but for undetermined reasons were not completed to ASD's satisfaction until December 1980. The following is a brief chronology of events leading up to the removal of the nozzle segments from the F-15 fleet.

In February 1979, a limited (instrumented) flight evaluation at Edwards Air Force Base showed that removal of F-15 nozzle segments produced no qualitative changes in handling qualities and cruise performance. Following this test, ASD authorized removal of the nozzle segments from F-15 aircraft operating from Luke and Nellis Air Force Bases.

By October 4, 1979, the 103 F-15's at these two bases were flying without nozzle segments. The 3,360 assets thus realized by the removal were then redistributed to reduce not mission capable-supply conditions at other bases. Later that same month, the San Antonio Air Logistics Center (SAALC) awarded a contract for 10,640 additional nozzle segments at a cost of about $12 million.

In September 1980, Headquarters, Tactical Air Command, directed the remainder of their bases to remove the nozzle segments from all F-15's except those scheduled for transfer to the Pacific Air Force (PACAF). TAC indicated there would be no flight restrictions on operating limitations once the segments were removed.

The TAC decision was a matter of immediate concern to SAALC inventory managers who realized that PACAF and United States Air Force Europe (USAFE) might follow suit in directing nozzle segment removal and that SAALC might suddenly be stuck with a huge inventory of unneeded assets. Consequently, SAALC personnel began to make tentative plans to terminate undelivered contract orders and reduce or cancel planned repairs, but they believed they could

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take no firm or substantial actions until ASD made a decision on whether the nozzle segments would be removed fleetwide. In a September 1980 message, SAALC urged ASD to provide official sanction to the actions already in progress at TAC and to make nozzle segment removal mandatory in all commands. The message concluded, "the saga of F-100 turkey feathers needs to be brought to a final conclusion without delay. The amount of support dollars and maintenance manhours spent on this item when compared to the benefits derived from its use provides a most unfortunate example of the impact of engineering decisions on support costs." (Emphasis added)

In its October 1980 response to SAALC, ASD indicated that concerns about reduced durability after nozzle segment removal had been eliminated due to the evaluation at Luke and Nellis AFB's. ASD also said that while the February 1979 limited test at Edwards AFB showed no change in performance, more complete performance testing was planned, and completion would be delayed until December 1980. Further, ASD said the impact of changes in the infrared signature had not been assessed, and a decision on fleetwide removal would be made when the tests were completed and results analyzed. Regarding SAALC's concern over finding itself in an excess stock status if and when removal of the segments from the entire fleet was directed, ASD indicated that excess F-15 hardware could be effectively utilized on F-16 aircraft.

According to SAALC personnel, ASD's decision to remove the nozzle segments from all F-15's finally came in December 1980. After SAALC deleted the nozzle segments as an F-15 application, its automated requirements computation system produced a computation dated March 4, 1981, which showed that 15,273 of the 17,308 turkey feathers then on order from the contractor should be terminated. On April 6, 1981, inventory managers requested that SAALC procurement terminate all 10,640 assets ordered in October 1979 as well as 4,633 ordered earlier. However, only 1,578 could be terminated at no cost to the Government and, consequently, 13,695 unneeded nozzle segments valued at $15,489,045 were kept on order.

In addition to the above, over 15,000 segments previously installed on F-15's were shipped by bases to the depot at SAALC. While these assets are coded as unserviceable, SAALC personnel said that most of them are actually serviceable. It will be necessary to individually screen each item to identify part number/configuration and condition.

The factors discussed above have all combined to provide SAALC with a tremendous investment in unneeded assets. As of March 1982, there were almost 38,000 nozzle segments on hand or due in from contract. Over 17,000 of these valued at about $25 million were classified as excess.

F-16 aircraft (also equipped with F-100 engines) still use nozzle segments and some, but not all, configurations of assets bought for the F-15 program can be used to support F-16 replacement

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requirements. However, according to SAALC personnel, the demand rate for F-16 nozzle segments is only about 300 per month. If this demand rate remains constant and all could be used on the F-16 the 17,000 excess assets alone would last almost 5 years, even if repair of unserviceable items is not resumed.

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Report of April 22, 1982

DOD CLAIMED ECONOMIES AND EFFICIENCIES REFLECT ESTIMATED SAVINGS IN TOA OF $13.8 BILLION

The Investigative Staff has reviewed selected items of savings claimed in the February 8, 1982, Department of Defense (DOD) document entitled Economies and Efficiencies, Department of Defense.

Although portrayed by DOD as being fully supportable, the claimed savings are questionable. Examination of 16 of the acquisition items, with Total Obligation Authority (TOA) savings totalling $2.1 billion, disclosed that only $152 million were valid TOA reductions and capable of being realized as savings in the fiscal years claimed. Savings of $807 million were either improperly claimed as a savings, overstated, or not clearly achievable. These savings were based upon avoidance of proposed rather than planned actions, and unrealistic predictions and assumptions regarding program stability, production flexibility, and availability of subcontractor and vendor materials and equipment. The items also failed to take into account offsetting impacts and costs which, in some instances, could actually increase TOA for the programs listed.

Savings of $1.1 billion related to misleading claims of savings in Total Obligation Authority for FY 1981-1987. These programs had predicted savings which were based on either multiyear contracting or economic production rates for Air Force and Navy aircraft procurement. The judicious use of multiyear contracting admittedly lowers unit cost and thereby reduces total program cost when the quantity remains unchanged. However, when the multiyear option also accelerates the buy and increases the number of aircraft to be funded each year, it does not produce overall savings in TOA for the years involved. In some instances, the total program buy was increased substantially from the baseline quantity.

Although this yields more aircraft procured at a lower average unit cost, the total program cost is increased as is the TOA required; in effect, to take advantage of the lower per unit price, DOD is asking the Congress to provide additional funds. Whether the net result is an actual savings or an obfuscation depends on the point of view espoused.

Claimed savings relating to operations were not examined due to nonavailability of supporting documentation which was in the process of reevaluation by OSD and the military departments.

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On February 8, 1982, Department of Defense (DOD) released a listing of Economies and Efficiencies reflecting estimated savings in Total Obligation Authority (TOA) which are attributed to the current Administration's defense plans and policy. Savings of $13.8 billion in TOA for FY 1981-1987 were identified with various acquisition initiatives, including lower cost alternatives, multiyear contracting, economic production rates, elimination or reduction of marginal programs/systems, and other acquisition improvements. Another $6.9 billion was claimed as savings resulting from eliminations, reductions, and other improvements in operations. The listing contained 137 individual items of savings claimed for acquisition economies and efficiencies, and 117 items related to operations.

The Investigative Staff randomly selected 16 of the acquisition items for detailed examination of supporting documentation. Interviewed were officials of Office of the Secretary of Defense (OSD) and military department budget offices, weapon system program offices, major contractors, and user organizations.

Claimed savings relating to operations were not examined due to nonavailability of supporing documentation which was in the process of reevaluation by OSD and the military departments.

E-3A Procurement and Production Plans

Savings of $159 million were improperly claimed by the Air Force as the result of "restoration" of the original procurement program of two aircraft in FY 1982 and two aircraft in FY 1983 versus deferral of the production of FY 1982 aircraft until FY 1983. The FY 1982-86 budget planned a reduction in production from two to zero aircraft in FY 1982 and doubling of the original production from two to four aircraft in FY 1983. The changes were regarded as nothing more than another "what if" exercise involving a proposed revision to an existing production plan. The revised plan was never seriously considered for implementation by the Air Force or the contractor because it would have caused a production break and nullified previously negotiated contracts on USAF and NATO aircraft. In fact, despite the deferred FY 1982 funding, the contractor maintained the original production schedule and did not propose any change in negotiated contract prices. Consequently, the claimed savings represent illusory, rather than real, cost avoidance derived from not making a change--a change which no one intended to make in the first place.

The tenuousness of the claimed savings is further demonstrated by a revised listing produced by the Office of the Secretary of Defense (OSD), dated March 29, 1982, in which 11 items totalling $518 million in savings claimed for acquisition economies and efficiencies were deleted, as well as 27 items totalling $1.3 billion in claimed savings related to operations. Obviously, the military department submissions were not carefully reviewed by OSD prior to preparation of the original listing, as borne out by the results of the Investigative Staff's review which follows.

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E-3A Procurement of Radar as GFE

An OSD decision would require the Air Force to procure the E-3A radar from the manufacturer and provide it as Government Furnished Equipment (GFE) in lieu of allowing the prime contractor to continue purchasing it as contractor furnished equipment. The action was aimed at saving the management fee paid to the prime contractor, estimated to total $51.3 million for FY 1983-87. However, a study by the E-3A system program office indicated that the management fee saved would be $35.2 million, and that there was a $30.2 million offsetting cost to obtain that benefit. In addition, the study concluded that the AWACS radar does not meet component breakout criteria and the marginal benefit does not justify taking this action. The Air Force emphasized that significant irreplaceable technical and management support would be lost, and therefore, an unacceptable risk would accrue to the program. In this instance, a savings is being claimed for a proposed imprudent decision which could result in costing the Government considerably more than it is expected to save.

E-3A Procurement of Consoles as GFE

The Air Force estimates savings of $2.8 million will result from procuring the E-3A surveillance display consoles from the manufacturer and providing them as GFE in lieu of allowing the prime contractor to purchase them as contractor furnished equipment. Although the consoles appear to be valid candidates for component breakout, the Air Force erroneously computed the unit cost difference to be double the correct amount. The savings, therefore, should be $1.4 million instead of $2.8 million.

E-4B Procurement Program Reduction

A decision to not procure two additional E-4B aircraft for the "looking glass" role of the Strategic Air Command (SAC) resulted in deletion of $569.5 million previously included for these items in the FY 1982-86 budget. However, claiming that elimination of the aircraft was for the purpose of effecting economy in the program is misleading. The decision was simply due to a SAC determination that the E-4B would not meet its requirements. SAC will have to continue to use EC-135 aircraft for the mission pending replacement of the whole EC-135 fleet with another type of aircraft, currently planned for 1989-92. Therefore, the acquisition of new aircraft is being deferred rather than eliminated. In addition to not considering the offsetting cost of procuring alternate aircraft at a later time, the claimed savings failed to recognize the fact that with the two additional E-4B's, SAC was expected to be able to eliminate between 5 to 12 EC-135's.

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F-16 Multiyear Contracting

The savings due to multiyear contracting for the F-16 program could not be validated due to the considerable confusion over the year-to-year accounting differences between the principals involved in the action. The following illustrates the variations in presentation of the estimated savings. All estimates are for a multiyear quantity of 480 aircraft.

TOA DOLLARS MILLIONS SAVED

Source	FY 1982	FY 1983	FY 1984	FY 1985	Total
OSD Economies* and Efficiencies Report of 2/8/82 --	8.0	84.0	40.0	114.0	246.0
OSD Economies and Efficiencies Report (Revised) of 3/29/82 --------	29.0	58.8	83.8	87.9	259.5
F-16 SPO, Dayton, Ohio Computation of 3/29/82 ----------	-249.2***	162.5	201.5	144.7	259.5
General Dynamics Ft. Worth, TX Computation of 3/31/82** ---------	28.4	67.8	99.4	130.2	325.8

*Estimates prior to new escalation index availability.
**CPE Air Vehicle only. Escalation index does not agree with official Air Force guidance.
***Reflects first year termination liability funding.

It should be noted that the multiyear quantity is actually 435 aircraft, not the 480 used in the computations. The first 45 aircraft will not benefit from the contracting technique used due to long lead procurements and production commitments.

The savings reported by OSD in the revised Economies and Efficiencies Report (March 29, 1982) do not take into consideration the termination liability aspect of multiyear contracting which will be funded in FY 1982.

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There is agreement that use of multiyear contracting lowers unit cost and thereby reduces total program cost, when the quantity buy remains unchanged. A comparison of the F-16 multiyear at 10 aircraft per month versus annual funding at 10 per month would demonstrate that the multiyear option will cost significantly less. However, in a comparison of TOA needed for a multiyear buy of 10 per month versus annual funding based on a buy of 8 per month, the multiyear option does not produce overall savings in TOA for the years involved, but does yield more aircraft procured at a lower average unit cost.

F-16 Buy Acceleration

Savings of $747 million originally estimated for FY 1982-86 as the result of increasing the F-16 annual procurement rate from 96 aircraft (8 per month) to 120 aircraft (10 per month) were subsequently revised to $851.7 million. However, current production plans do not provide for a decrease in the F-16 TOA to be required due to increased program quantities and higher production rates. The requirements associated with the January 1981 FYDP was 1,388 aircraft, while the February 1982 FYDP shows an increase to 1,985 aircraft. The original estimated total program costs for 1,388 aircraft was $20.3 billion and for the revised estimate of 1,985 aircraft the costs increased to $40.9 billion.

The total of 597 additional aircraft are a combination of 59 F-16 C/D aircraft and 538 derivative F-16 aircraft needed for the new air-to-ground fighter mission. The 59 aircraft are included to stabilize production at General Dynamics until such time that the derivative F-16 can achieve reasonable production rates. Undoubtedly, the Air Force can justify on a mission requirement basis the need for the additional 59 aircraft. These 59 aircraft do not appear to be required on the eight per month quantity of the original program of 1,388 aircraft, which would allow for smoother transition to the production phase-in of the derivative F-16's. Using the Air Force average unit cost for FY 1986, these 59 F-16 C/D aircraft will cost $1,074 million. Compared to the latest estimated savings for FY 1982-86 of $851.7 million, this shows an additional TOA requirement of approximately $222 million.

The unit cost for the acceleration of production is indeed less and more aircraft are available for the Air Force. However, even without the additional 59 F-16 C/D's associated with the 10 per month rate, the annual TOA for increased production exceeds the annual TOA for the eight per month option.

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CH-53E Aircraft Production Rate

The Navy is claiming $10.9 million net savings for FY 1982 based upon lower unit flyaway cost resulting from an improved economic production rate. The unit flyaway cost as of January 1981 was $17.9 million for 11 aircraft, as compared with the current flyaway cost of $16.9 million for 14 aircraft. Applying the unit price difference to the original 11 aircraft produces the $10.9 million in savings.

Based on prime contractor input, the Navy's claim that $10.9 million can be saved due to an improved economic production rate appears reasonable. However, more TOA will be needed to fund the additional aircraft, increasing the cost during FY 1982.

SH-60B Accelerated Procurement

Savings of $26.7 million are expected in FY 1986 due to accelerating the procurement of 10 aircraft from FY 1986 to FY 1982. The November 1981 cost sheet depicts the FY 1986 unit cost at $14.2 million. The Navy adjusted the unit cost downward to compensate for the change in the production business base. This resulted in a per unit cost of $11.5 million in FY 1982; a saving of $2.7 million per unit in escalation costs by moving the procurement ahead of schedule. The $2.7 million per unit saving is multiplied by the 10 aircraft to produce the claimed savings of $26.7 million in FY 1986. Based on the data supplied by the contractor, the savings appear to be valid.

CH-53E Accelerated Delivery Schedule

The Navy estimates savings of $10 million to be achieved by the contractor's decreasing both production and component lead-times that resulted in an accelerated production cycle. The resultant reduction of the aircraft funded delivery period from 42 to 37 months, served to lower the impact of overhaul and escalation. The $10 million savings resulted when FY 1981 and FY 1982 production leadtimes were each compressed by 2 months and the FY 1983 and FY 1984 programs were each moved forward by 4 months with the estimated savings in escalation costs. Additional savings accrue from the reduced labor hours associated with each of these lots. Based on the data supplied by the contractor, the savings appear to be achievable.

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CH-53E Multiyear Procurement

Savings of $35 million are estimated to result from a multiyear procurement of 61 aircraft beginning in FY 1984 and continuing through FY 1988. Calculations are based on a comparison of the multiyear program with an annually contracted program of a comparable quantity. The Navy claims the CH-53E meets the criteria for multiyear procurement because the procurement requirement for the planned period is expected to remain stable and configuration changes will have been identified prior to the contract award. The savings are expected to occur because the prime contractor will have increased program and production stability, and his risks are reduced. The prime contractor estimates a $48 million savings (constant 1981 dollars) which is a 6.6 percent savings over an annual procurement program. Based on the data supplied by the contractor, the savings appear to be achievable providing all projected events take place.

C-2A Multiyear Procurement

The Navy's claim to $58.4 million in savings over a five year multiyear procurement program (FY 1983-87) appears reasonable primarily because design stability makes it a good multiyear candidate. However, whether the benefits of multiyear procurement can be achieved depends upon whether vendors can be committed to economic ordering practices. At present about 15 percent of the vendors are "locked up." Many more must be committed to the prime contractor's procurement plan to realize the projected savings. Certain vendors, such as the landing gear manufacturer, may be unable to deliver at desired rates due to their own production and other limitations.

Other factors may diminish the projected savings. For example, if the prime contractor's overall business base shrinks the unit price for the C-2A will probably increase. Likewise, if E-2C aircraft procurement quantity is reduced, C-2A costs will escalate. More importantly vendor cooperation with the multiyear concept is essential to financial success. Until vendors are actually under contract, multiyear savings predictions, particularly in the outyears where most savings occurs, may prove as ephemeral as a warm day in the arctic.

EA-6B Multiyear Procurement and Improved Production Rates

The Navy's claim to $36.8 million savings based on lower unit cost achieved by raising production from two to six in FY's 1982-83, will actually increase TOA while providing the lower unit price per aircraft.

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On the other hand, savings of $25.5 million projected over a 4-year multiyear buy (FY 1984-87) rests on unrealistic assumptions that optimum conditions would prevail. The program manager indicated that avionics changes could require design modifications to increase the cooling capacity for all electronics equipment. Major suppliers, particularly those building parts common to the A-6, must permit economic order buys. Fluctuations in the prime contractor's business base, difficult to accurately predict in FY 1984 through 1987, could also raise unit cost.

Moreover, contractor cost estimates differ dramatically from Navy pricing of this multiyear plan as seen in the comparison for 24 airframes FY 1984-87:

	Annual Buy	Multiyear
	------in millions------	
Contractor -----	$542.2	$500.4
Navy ----------	429.6	408.5
Difference --	$112.6	$ 91.9

A-6E Multiyear Procurement and Improved Production Rates

Savings of $58.4 million for FY 1982 and FY 1983 accrue from improved economic production rates, increasing from 4 to 12 aircraft in FY 1982 and from 4 to 8 aircraft in FY 1983.

Contractor data suggests this amount may be somewhat overstated. It should also be noted that savings represents unit cost savings and not TOA economies since the increased number of aircraft in the Regan budgets for FY 1982 and FY 1983 would require more funding.

Savings of $20.3 million for a multiyear procurement of 44 aircraft FY 1984 through FY 1987, versus an annual buy, appear attainable. However, these estimates may erode in the face of optimistic tooling assumptions or possible design changes to accommodate the HARM and HARPOON missile weapon systems.

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F-14A Economic Production Rates

DOD claimed net savings of $70.9 million for FY 1982 and FY 1983 is based on flyaway unit cost economies. Examination of available data indicates this amount to be attainable. However, it should be noted that the increased production rates will actually add cost to the TOA for these years. The claimed savings will never materialize due to the increase in aircraft program requirement from 509 (Carter) to 845 (Reagan).

Summary of Evaluation

The results of the Investigative Staff examination of the 16 items of claimed TOA savings totalling $2.1 billion, indicated that $151.8 million were valid TOA reductions and $1,976.7 million were not. The following table summarizes this detail.

DOE CLAIMED ECONOMIES AND EFFICIENCIES RESULTING IN TOA SAVINGS—FY 1981-1987
($ millions)

Item	Claimed TOA Savings	Valid TOA Reductions	Invalid TOA Reductions
E-3A Procurement and Production Plans	$ 159.0	$	$ 159.0
E-3A Procurement of Radars as GFE	51.3		51.3
E-3A Procurement of Consoles as GFE	2.8	1.4	1.4
E-4B Procurement Program Reduction	569.5		569.5
F-16 Multiyear Contracting	246.0		246.0
F-16 Buy Acceleration	747.0		747.0
CH-53E Aircraft Production Rate	10.9		10.9
SH-60B Accelerated Procurement	26.7	26.7	
CH-53E Accelerated Delivery Schedule	10.0	10.0	
CH-53E Multiyear Procurement	35.0	35.0*	
C-2A Multiyear Procurement	58.4	58.4*	
EA-6B Multiyear Procurement	25.5		25.5
EA-6B Improved Production Rates	36.8		36.8
A-6E Multiyear Procurement	20.3	20.3*	
A-6E Improved Production Rates	58.4		58.4
F-14A Economic Production Rates	70.9		70.9
Totals	$2,128.5	$151.8	$1,976.7

* Potential reductions can only be realized if program quantities are unchanged and authorization is granted for multiyear contract.

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Report of April 28, 1982

PERSONAL DEFENSE WEAPON (PDW)
PROCUREMENT PROGRAM

DOD efforts to procure a common Personal Defense Weapon (handgun) for the use of the military departments was the direct result of a Committee-directed investigation (conducted in 1978) which determined there was a proliferation of both handguns and types of ammunition in DOD, and subsequent Committee direction to DOD to address the deficiencies and make the necessary improvements.

The evaluation of the various actions undertaken by OSD and the Army and the Air Force in connection with the proposed purchase of a new Personal Defense Weapon (9mm) illustrates rather dramatically the many ills in the DOD procurement process. These deficiencies have been identified in example after example during the several recent studies and reports to the Committee. Although extensive time and resources were devoted by all of the parties to the aborted purchase of the 9mm handgun, the entire procurement process was reduced to a useless exercise because of a "turf"-oriented attitude by the principals. In effect, the proposed procurement was held captive in a power game, with the result that what should have been a rather ordinary purchase of an off-the-shelf item, ended up being a classic case of bureaucratic misdirection without final resolution of the underlying difficulties. Some of the key issues which contributed to this situation were:

- The program initiated by OSD through the establishment of a Joint Services Small Arms Program (JSSAP) management committee, composed of representatives from each of the military services, was deficient in several respects as it failed to, (a) provide complete direction on the overall procedures to be followed; (b) identify the specific type of handgun to be acquired, i.e., off-the-shelf or developmental; and (c) assign direct responsibility and authority to a senior OSD official for committee oversight and program management.

- Lacking specific guidance, the JSSAP committee created a Joint Operational Requirement (JSOR) for a new PDW in a collegiate atmosphere, based and insisted upon by the often subjective requirements of its various military members. As a consequence, the JSOR dictates, more or less, the procurement of not one but two handguns

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(albeit of common 9mm caliber) with associated equipments and ammunition. Of necessity, such a course of action mandates the initiation of a lengthy and expensive research and development program. Thus, this JSOR contributes to the proliferation of weapons and ammunition in DOD, rather than decreasing it.

- Inconsistently, OSD, prior to completion of the JSOR, ordered and the JSSAP committee sanctioned the purchase of a handgun (using the 9mm NATO standard caliber bullet). This decision reflected prior independent Air Force testing and experimentation with 9mm weapons. While the Air Force test results and recommendations were accepted by all service representatives to the JSSAP committee and were provided to the Army for use in the directed procurement of a 9mm handgun, Army in its role as executive agent for small arms procurement, rejected the Air Force test as a basis for procurement, labelling it useless.

- Army, then, performed its own full-scale duplicative and lengthy source selection test--very technical and by the book--the results of which disclosed that no proposed weapon passed the reliability requirement. As a result, Army announced that procurement action for a new handgun was being cancelled.

- Confrontations developed between Army and OSD, including the Air Force, over the chain of events leading up to the Army decision to not procure the new handgun and its later position to rewrite the handgun specifications before new proposals could be requested. OSD's frustration with the lack of positive results in the procurement of a new handgun is coupled with its inability to secure Army's cooperation in this entire matter. Some of the concern of OSD relates to the additional time and costs involved, i.e., estimates indicate as much as 2 years and $1.8 million more would be required.

- Indications are that Army is and was not entirely sold on the need for a new handgun. In responding to various initiatives of OSD, Army mentioned that such a procurement was a very low priority item in its scheme of things, and available funding was not forthcoming. It appears that the Army cloaked its resistance to this procurement behind the need to comply with its established policy and procedures.

In view of the above-mentioned circumstances, it is unlikely that any real momentum can be expected in the near term towards the procurement of a new handgun. All indications are that the ultimate decision rests with the Army. Unless it has reason or is so motivated to ascribe a higher priority to this procurement action, the Army can, according to past records, indefinitely

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stretch out its decision through the process of revising the technical requirements and putting together what it views as a qualified procurement package.

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Background

The last common handgun issued to U.S. Forces was the .45 caliber M1911A1 automatic pistol now in its seventy-first year of service. It is a product of turn-of-the-century technology and was accepted into military service in 1911, even though its introductory test program resulted in the identification of shortfalls that would have prohibited its procurement if measured by current Army acquisition and test practices.

Performance data for the .45 caliber M1911A1, aside from the results of its initial tests in 1911, are literally nonexistent. Efforts by the Investigative Staff to obtain reliability statistics covering the use of this weapon for the past 71 years resulted in explanations that such figures are not available because none of the services kept records of failures. There are, however, records available of the current condition of each weapon frame, its overhaul history, and of procurement actions undertaken to obtain replacement parts.

According to military officials, aside from the handgun proliferation problem pointed out to DOD by the Committee, the poor condition of M1911A1 frames is the primary reason for replacing the weapon. The last new .45 procurement action by the Army was in 1945. Based on a consensus of officers tasked with control of the handguns in each of the services, the M1911A1 frame is old, the metal has reached or exceeded its fatigue life, and it is wearing out.

The overhaul or reconditioning of the M1911A1's in the inventory appears to be a point of frustration for both the Army and Marines. Back orders for parts have been up to 2 years, particularly for barrels and slides. This may be a function of what has become the preferred method of procurement for these items. Component parts for the M1911A1 have frequently been the subject of procurement actions following the guidelines of the Small Business Administration (SBA) wherein contracts are awarded to firms whose capacity for production and quality control are limited. The result has been that items such as the magazine, a critical component of each weapon and the prime player in past and present reliability problems with the .45, have been found to be of such poor quality that many can be used only one time.

The Need--U.S. Marine Corps and Coast Guard Problem

At the outset of this inquiry, each Department of Defense (DOD) department was questioned as to its need to replace the M1911A1. It was determined that the U.S. Marine Corps has such a need. For the past 3 years, the Marines have withheld purchasing

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or overhauling weapons with the expectation that a new handgun purchase was in the immediate future. According to the Assistant Commandant of the Marine Corps, this calendar year is one in which the Marines will be required to either fund a weapon procurement or initiate a major overhaul program to meet its basic handgun inventory requirements.

The Office of the Under Secretary of Defense for Research and Engineering (USDR&E), advises that the Coast Guard, a Department of Transportation Agency, also has an urgent need for a new handgun. Since it depends upon the DOD to acquire its small arms, that need has become part of the requirement expressed in DOD's acquisition process. The Army, Navy, and Air Force had no written requirement to replace the M1911A1 prior to the issuance of the Joint Service Operational Requirement (JSOR) of 1981. Even after these services signed the JSOR, handgun procurement remained very low on their acquisition priority list. In fact, the Navy actually had an excess of weapons and has provided 35,000 to the Marines in the past 2 years. It should be noted, however, 66 percent of these weapons were unserviceable code "F" and were ultimately cannibalized for parts.

The Joint Services Small Arms Program

Following identification of the handgun and ammunition proliferation problem and Committee direction to procure a common PDW, DOD created a program, the Joint Services Small Arms Program (JSSAP) with a management committee to study the problem. The JSSAP management committee is composed of a representative from each military service and its purpose is to manage the development of all weaponry smaller than .50 caliber. Its method of operation is to dole out to various services the responsibility for developing small arms projects. The Army is designated the executive agent to administer the procurement of the various JSSAP-approved programs. In charter, the JSSAP management committee appears to be a viable entity; however, upon review, the Investigative Staff found that there was no real authority delegated to the committee nor does it have a responsible OSD sponsor to which it reports its recommendations. This, in effect, provides that any decisions made by the JSSAP committee are subject to ultimate Army approval, or disapproval, as it chooses.

The JSSAP committee conducted a review of the current .45 caliber situation, identified the problems previously discussed, and investigated possible replacement calibers. It concluded, based on its deliberations which included the results of independent Air Force testing, that a weapon using the NATO standard 9mm parabellum bullet was the best and most cost-effective choice for a new PDW. This decision was partially based upon this type of weapon's commonality to NATO countries and general worldwide acceptance.

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Most knowledgeable ballistics people agree there is an economic advantage to the 9mm caliber. This is derived not only from its availability outside the United States, but also, the basic bullet is cheaper to produce because it is smaller and requires less raw materials. Since the raw materials constitute the major portion of the manufacturing cost, the 9mm is cheaper. There are no U.S. manufacturers of certified NATO 9mm, although they do produce commercial 9mm. Only four companies worldwide produce 9mm ammunition to NATO specifications. According to Army officials, conversion to the NATO 9mm specifications by U.S. companies requires little technical effort and basically could be realized at no additional cost to a large procurement contract. In fact, during the JSSAP review one U.S. ammunition producer offered a cost comparison based upon normal ammunition buy rates of the Army. The contractor's cost study disclosed that production of .45 caliber ball ammunition cost 19 cents per round and NATO specified 9mm ball, 13 cents per round. Taken at face value there appears to be an obvious cost benefit.

One senior Army member of the JSSAP management committee, an apparent advocate of the .45 caliber M1911A1, took exception when the cost benefits of the 9mm were raised, and in a dissenting letter to the OSD stated that according to his computations it would take "50 years or a war" before the Army would recognize any cost benefits from the 9mm. In retrospect, the application of such reasoning to other DOD weapons procurements might reveal some equally dismal "cost benefits."

Following the JSSAP committee recommendation and prior to completion of the Joint Service Operational Requirement (JSOR) for a PDW, OSD directed procurement of a common 9mm handgun. The JSSAP was tasked to proceed and in turn it provided funding for 9mm tests to the ongoing foreign weapons testing and experimentation being conducted by the Air Force at Eglin AFB, Florida. With one exception, weapons for these tests were purchased from contractors and the contractors were provided the opportunity to adjust and repair the weapons during the first half of the testing. Contractors were barred from the test sites during the last half of the testing which involved only military personnel. These weapons were tested for endurance, accuracy, shooter acceptance, and environmental exposure. All tests were completed except cold weather testing which was halted because it was found that the ammunition failed before the weapons.

The endurance testing was considered the most important for military application. In these tests, two weapons, the Beretta and Smith and Wesson 9mm's exceeded the specification noted in the draft JSOR (643 mean rounds between operational mission failure). The Beretta 9mm was later identified by the Air Force as the winner at the end of the testing and was recommended for procurement. All members of the JSSAP committee, including the Army representative, agreed to the Air Force recommendation and, in accordance with JSSAP committee procedure, provided the results to the Army for procurement.

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The Army Test and Evaluation Command (TECOM) reviewed the Air Force test data and concluded that additional tests were required prior to a procurement. For example, they complained that the Sand, Dust, and Mud tests were not conducted using military specification sand, dust and mud; that the rough handling tests were incomplete; and that the cold weather tests were incomplete.

The JSSAP-sponsored Air Force test report was also provided to each of the service representatives for signature at the same time it was given to the Army. The Army, began staffing the test report through each of its testing and procurement bureaucracies, a process that, as of the date of this report, has never been completed. To this day the Army does not recognize the Air Force test report, claiming that it was not formally published, when in fact the Army bureaucracy frustrated and delayed its formal acceptance.

OSD, accused the Army of "dragging its feet" in this instance and imposed a procurement decision date of December 1982. The mandated time for contract award then became a focal point of friction between the Army and OSD. In late 1980, the Coast Guard advised OSD they had funds available and desired an early 1982 contract award. In April 1981, USDR&E, moved the procurement date up 12 months, and sent a memorandum to the secretaries of the various departments which said, "prepare and implement a more expedited schedule which results in completion of all steps in acquisition strategy-which leads to a production award not later than January 1982." At this point, the Army overtly balked and requested a later award date of May 1982, which was denied. The Assistant Secretary of the Army then sent OSD a memorandum saying that the January 1982 date was achievable for "compliance" but that the May 1982 day was "most likely." OSD reaffirmed the compliance date of January 1982 with a caveat that any change in the program milestones which would extend that date be presented to OSD 2 weeks prior to any breach. This direction was an important point in the interaction between OSD and the Army with respect to this program, and the impact of the Army's failure to comply with it has had serious consequences. For instance, the Army's failure to take timely procurement action caused the Coast Guard's appropriated funds to lapse.

A review of the chronology and correspondence as exemplified here is typical of the "in fighting" which characterized relations in DOD with respect to this program. OSD attempted unsuccessfully, to direct the Army to take positive action in this case. However, the Army resisted, stalled, and frustrated OSD's efforts by insisting that the labyrinth of paper and procedure in its acquisition process could not be pushed. The Army maintained that the 9mm PDW procurement was very low on their priority list but in view of the prominent visibility and high level of importance attached by others to the directed procurement, the Army claims it had no other recourse than to make sure that the procurement be "letter-perfect" in every sense. The Army demonstrably did

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drag its feet in response to OSD pressure by demanding that its lengthy and often obscure procurement regulations and policies could not be sidestepped. Without passing judgement on the rightness or wrongness of the action it directed, OSD found itself powerless to move one of its military departments to an action it was mandating, a situation which has interesting implications.

Air Force actions added confusion in this situation, primarily because its independent test results were a bone of contention between it and the Army. The argument flared out of control when the Army summarily dismissed the Air Force test as useless. One senior Army official described the Air Force test as "3rd grade work." So complete was the Army dismissal of the Air Force test that none of its results were used, even as an experience base for the subsequent Army source selection tests.

The Joint Services Operational Requirement (JSOR)

The results of the JSSAP committee's effort to develop a joint requirement for a handgun can best be separated into four distinct areas. First, are the performance requirements of the common handgun. These establish standards of desired functions such as the double action function; ambidextrous safety latches; probability of target hit criteria; grip convenience; size and weight; and magazine capacity. According to experts interviewed these are reasonable and attainable with state-of-the-art, off-the-shelf hardware. The performance requirement creating the problem was the amended MRBOMF figure of 800.

In September 1981, 2 weeks prior to the Army source selection test start, the Air Force member of the JSSAP committee objected to the first JSOR requirement of 643 MRBOMF as being too low. Air Force experimentation and testing had attained more than 2 times that figure (1,500 rounds) and consequently the Air Force insisted on raising the JSOR requirement. The first JSOR figure was the original 1911 requirement number for the M1911A1, which according to the Army it never met. This figure was restated in the JSOR since it was believed that in the period between 1911 and 1982 the state-of-the-art would have improved to the point where a modern handgun could meet it. Negotiations concerning these two figures (643 and 1,500) resulted in a compromise at 800 MRBOMF which was added to the JSOR as an amendment in September 1981. All parties believed that such performance would be achievable. Bystanders to the debate noted that the JSSAP philosophy should have been the primary yardstick in the selection of a new PDW, and this philosophy was that "the gun selected must perform as well as or better that the .45 caliber M1911A1." Since, as previously stated, no data is currently available on how the M1911A1 .45 caliber performed, the Army also had to test it along side candidate weapons just to have a secure base for a decision.

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Subsequent analysis has determined how failures and stoppages were counted and what actions to correct them were allowed is the basis for the difference in the Air Force and Army testing results. In the opinion of many handgun experts, the 800 MRBOMF figure is reasonable and attainable but not when subjected to stringent Army tests which are without reasonable flexibility. These same experts advise that the Air Force tests allowed too much manipulation and repair during the testing to be a valid representation of failure rates as measured against any requirement. With these issues in mind, it is considered likely that any firm statement of a MRBOMF as a requirement may be testing agency dependent and possibly should be omitted in a joint requirement other than as a general philosophy statement of "better than the current M1911A1" as was the original intent.

The JSOR contains a statement, pressed by the Air Force, requiring a follow-on, smaller handgun. Air Force officials cite this as a "hard" requirement because the common handgun will be too large to be carried by its aircrews and special operations people (who now carry a 4" revolver). Tied to this smaller gun is a requirement for all of the weapons to be adaptable to a silencer. The JSOR contains considerable specifications for this silencer and its adaptation to the gun. These requirements came into being as a result of an alleged Tactical Air Command (TAC) requirement that its aircrew weapons have a silencer to aid in the undetected escape and survival of downed pilots. Although programmed procurement numbers for silencers were added by all of the services, only the Air Force, particularly its representative on the JSSAP management committee, maintained it had a need for them. TAC was unable to quantify its requirement for this item and, in fact, advised that it did not have one. Subsequent investigation determined that this Air Force requirement was generated by a low-ranking Air Force civilian at Eglin Air Force Base, Florida, based on general unofficial conversations with a similar individual stationed at Headquarters Pacific Air Force, Hickham Air Force Base, Hawaii. These subjective and unvalidated actions narrowly missed committing the U.S. government to an expensive and obviously unnecessary procurement.

The Commanding General of the Army Aviation Center noted that 30,000 of the Army's expected buy of 60,000 silencers were for its aircrews, yet no one had ever asked the Aviation Center if Army aircrews needed them. He stated that, "The Aviation Center does not support the concept of its aircrews having a silenced weapon." In fact he said just the opposite to be true--noise of the weapon aided in the location of a downed aviator by searching parties.

Weapons experts were queried about the technical aspects of the silencer specified in the JSOR and they advised that such a silencer is not available using current technology. Should a silencer be built to meet the performance specifications, it would be large and cumbersome, resulting in a weapon, plus silencer,

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whose size would be several feet long and certainly not practical to aircrews in small cockpits. The requirement for a small handgun and silencer in the JSOR sets the stage for a major Research and Development program which would further add to the proliferation of handguns in DOD. (The Navy is continuing its research and development efforts in silencer technology, under the auspices of the JSSAP committee.)

The JSOR also contains a description of various ammunitions to be used in the common handgun, only one of which is the standard NATO 9mm parabellum. The remainder is special purpose ammunition and is likely to also be the product of another R&D program.

The Army Source Selection Tests

The JSSAP committee provided the JSOR to the Army for inclusion in a Request For Proposal (RFP) to the handgun industry. The resulting Army RFP was drawn with great specificity and included everything from bids for acceptance and testing to contract appearance--a volume of fine print 3 inches thick. In this document, JSOR paragraphs takeup approximately three pages and the remainder are Army imposed rules and specifications--("mil-specs") many of which are described by handgun experts as "unnecessary gold plating." Five manufacturers responded to the RFP. Efforts to officially obtain the identity of these respondents from the Army were not successful in that the Army maintained such information was "competition sensitive." Four proposals were ultimately accepted and one was rejected because it was a "paper proposal with no hardware provided for testing."

The Army designed test plan duplicated many tests the Air Force had already conducted and added many more with rigid standards. It is unknown from what data base the standards were derived since, as previously indicated, the performance of the M1911A1 had not been documented for 71 years and, according to the PDW program manager, the Army had not tested handguns in the last 31 years. The Army apparently used an aggregate of standards derived from other small arms programs.

The Army devised a test plan to collect data for the purpose of:

(a) Making comparisons among PDW candidates to determine which was best suited for the PDW role.

(b) Comparing the candidate weapons to the M1911A1 .45 caliber pistol (control weapon) where applicable.

(c) Comparing the candidates to the explicit requirements of the approved JSOR.

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The Army overemphasized item (c) and largely ignored the other items.

Army testing commenced at Fort Dix, New Jersey, with four new 9mm weapon makes and a representative sample of .45 M1911A1's taken from current stocks. It should be noted that the offerers of the new weapons who had participated in the Air Force testing changed their guns from the version tested by the Air Force to conform to the previously mentioned Army interjected requirements. These changes according to Air Force and Army testors were a major factor contributing to the failure of these weapons to pass the MRBOMF requirement.

In a sterile Army test environment the candidates were subjected to Army tests which basically consisted of: (1) reliability, maintainability, durability; (2) accuracy and dispersion; (3) probability of hit; and (4) safety.

According to Army officials, the test results showed all of the candidates had failed the reliability portion of the test (as measured against the MRBOMF requirement). However, a 51 percentile factor was considered in evaluating the candidates on technical suitability. Technical suitability included; endurance, environmental tests, interchangeability of parts, and many other detailed military specifications stated in the RFP. This subjected these commercial grade weapons to gold plated requirements beyond the intent and knowledge of OSD and the JSSAP committee.

The endurance portion of the test was conducted by firing the weapons in 50 round groups at a rate of 30 rounds per minute. The first round in every magazine was fired double action. Cleaning, inspection, and lubrication were performed after each 500-round cycle. Magnetic particle or liquid penetrant inspections were performed after every 1,000-round cycle.

Environmental tests consisted of high temperature, low temperature and saltwater immersion subtests. The temperature testing was conducted in a climatic-chamber at temperatures ranging from -60°F to +125°F. One of the most controversial tests conducted was the mud, sand, and dust test. As will be recalled, the Army had complained that Air Force testing had not employed "mil-spec" mud, sand, and dust. According to the other services, the Army is the only organization in DOD familiar with the details of these specifications.

An Army official indicated in addition to endurance, other technical aspects were considered, i.e.:

(1) Headspace specification--the necessary dimensions of the chamber to allow the cartridge to properly function--technically all but the .45 caliber failed, yet all the weapons do function.

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(2) Grips--one failed because it was too smooth and one failed when it melted after exposure to chemicals; i.e., "mil-spec" insect repellant.

(3) Chrome Plated Bore--all failed, however, this is not a feature normally found in a handgun, commercial or military, and is one of the "unnecessary gold plate" RFP military specifications. It is also expensive and increases the price of a barrel from approximately $20 dollars to approximately $50 dollars.

(4) Finish--all weapons failed but the Army told the contractors at the outset it would accept whatever they had.

The Army overlooked or intentionally omitted a major finding in their test results. The candidate weapons were tested at Fort Benning, Georgia, for "probability of hit" which basically means how well can a cross section of troops shoot the weapon. In three groups tested, the results were:

Group I--Expert .45 caliber M1911A1 shooters scored three of the test weapons as good as the M1911A1 and one less than the M1911A1.

Group II--Troops, including the required percentile of women, who were given average training on the M1911A1 scored two of the test weapons as good as, one better than, and one less than the M1911A1.

Group III--Troops with no or minimal exposure to handguns scored three of the test weapons better than and one equal to the M1911A1.

These results would appear to indicate that given an equal amount of training, troops will attain a higher "probability of hit" with a 9mm weapon than the .45 caliber M1911A1. Said in another way, it would appear to require less training time with a 9mm to produce a competent shooter.

During the Army source selection test, OSD wanted to be kept abreast of its progress. The Army balked at this request, indicating that the information was competition sensitive. It provided OSD only with a statement that the program milestones were being met. OSD reaffirmed the date of January 19, 1982, for a decision on which gun to buy. After pressure to extend the program from the Chairman of the House Armed Services Committee and the Secretary of the Army, the program was extended 30 days to February 19, 1982. On that day, the Assistant Secretary of the Army presented the Army's findings to the Deputy Secretary of Defense. The Army decided, based on its testing, to cancel procurement action of the 9mm handgun because none of the weapons tested passed the MRBOMF requirement. In fact, none achieved half that goal or even matched the original requirement established

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for the .45 caliber in 1911. It was the first time officials of the participating services or OSD had been given any notice that testing results would not produce a contract for a gun. It was determined that the Army test officials, shrouded in the secrecy provided by Army procurement regulations and policy, knew as early as December 1981, based on test data already obtained, none of the candidate weapons was going to pass. Yet, they continued the tests using up time under the guise of building a data base upon which to make a decision.

The Army now claims a new RFP will have to be written, based upon a revised JSOR that will have to be staffed, sent to industry and the entire test process repeated. The Army says that a debrief conducted with the contractors which enumerates their shortcomings will allow them to "fix" the guns so they will pass the test.

The process could take up to 2 years at an estimated cost of another $1.8 million.

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Major direction differences were noted in the actions taken by the Army and Air Force to acquire the handgun which may have been caused by a lack of declared OSD policy and intent. The Air Force independently tested and recommended procurement of a weapon based upon the philosophy of buying the best off-the-shelf gun. The Army apparently rejected this approach and subsequently performed its own independent test, either in the belief that one of the guns would pass its tests, or to create a development program of its own in the light of what it perceived to be lack of OSD direction.

Interviews with OSD officials have indicated a commitment to buy an off-the-shelf weapon and not for a handgun development program, but no evidence can be found that such a policy was ever articulated per se. The Investigative Staff was advised by officials of the Army and the Air Force that had OSD given more specific direction to the services as to what it wanted in a handgun the entire problem would not have occurred.

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Report of May 4, 1982

LIGHT ARMORED VEHICLE (LAV) PROGRAM

In its February 1982 report to the Committee on the Procurement Practices of the Department of Defense, the Investigative Staff noted some apparent discrepancies in the joint Army-Marine Corps program for the acquisition of new Light Armored Vehicles. More recent investigation has developed additional significant information concerning this program.

The requirements for these vehicles are in a state of flux, not only within the Army, but also between the Army and the Marine Corps as neither of the services has made up its mind on the type of vehicles it wants. In addition, they each are separately pursuing and will ultimately independently develop and test different vehicles. As in the case of the 9mm Personal Defense Weapon Program recently reported on by this Staff, all of this is being accomplished under the umbrella of a "joint" program without the benefit of a well-conceived and executed plan. The Army and the Marine Corps are also, at present, proceeding pell-mell into concurrent development, testing, and procurement; moreover, available information indicates that, despite an espoused philosophy to procure an off-the-shelf vehicle, the vehicles to be ultimately procured will be markedly different in important components from those included in the current crash program. Conditions are, therefore, present which provide the ingredients that historically have been the basis for the many weapon system procurement discrepancies noted in previous and current examinations of DOD procurement practices by this Staff. A notable example of this situation, particularly on point, is provided by the M2/M3 Bradley Fighting Vehicle program, wherein conflicting performance characteristics, accelerated and incomplete testing, and concurrency have resulted in the production of a vehicle that is judged by many to be inadequate for its intended role. Thus, a previous program failure may be viewed as establishing the basic logic for at least the Army's requirement for and procurement of a Light Armored Vehicle.

Even though DOD considers the LAV procurement a low-risk, nonmajor program, this can hardly be the case when planned acquisition is targeted at 3,059 Light Armored Vehicles at an estimated cost of about $1.6 billion from 1982 through 1988. In view of the manifest indecisions and shortcomings identified in this program, it is difficult to understand the sense of urgency continuing to surround the various actions of DOD, the Army, and Marine Corps in connection with it.

All indications suggest a more measured course of action based on well thought out plans and analytic evaluations and complete coordination within DOD of various requirements, followed by realistic development and testing before firm commitments are made to procure any type of vehicle(s).

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Program Description and Background

To provide Marine Corps assault echelons with a mobile, transportable armored capability, in December of 1980, the Marines initiated a program to acquire a number of light armored vehicles (LAV's). These include a Light Assault (LA) and Assault Gun (AG) vehicle as well as several other variant vehicles (e.g., anti-tank, recovery, etc.). The conceptual table of organization and equipment for the new Marine Corps Light Armored Assault Battalion contains an integrated mix of these proposed armored vehicles, as follows:

ARMORED VEHICLES
MARINE CORPS LIGHT ARMORED ASSAULT BATTALION

Vehicle Type	Quantity
Light Assault	55
Assault Gun	27
Mortar Carrier	8
Anti-Tank	15
Command and Control	8
Recovery	6
Logistics	16
Air Defense	10
Total	145

To achieve this new capability as quickly as possible, the Marine Corps proposed to test, evaluate, and select an "off-the-shelf" light armored vehicle which would form the basis for the LA and AG vehicles as well as all the variants.

Concurrent with the Marine Corps' program, the Army was independently involved in a program directed toward the acquisition of several light armored vehicles to provide a new transportable armored capability to Army light infantry and airborne divisions. In this context, the Army perceived requirements for a light armored gun vehicle which it called the Mobile Protected Gun--Near-term (MPG-N) as well as a Light Armored Squad Carrier (LASC). A restructured Army Light Infantry Division would contain an integrated mix of these vehicles as well as other vehicles currently being developed, (e.g., an anti-tank missile carrier--the HMMWV with TOW) as follows:

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ARMORED VEHICLES
ARMY LIGHT INFANTRY DIVISION

Vehicle Type	Quantity
Mobile Protected Gun	82
Light Armored Squad Carrier	209
Recovery[1]	29
High Mobility Multipurpose Wheeled Vehicle (HMMWV)[2]	
With TOW Missile	64
Utility	16
Total	400

[1] The Recovery Vehicle is a Marine Corps LAV variant for which the Army subsequently developed a requirement.
[2] Quantity shown relates to only HMMWV's found in the Mobile Protected Gun battalions.

Due to apparent similarities in the characteristics of the light armored vehicles required by the Army and Marine Corps, in May 1981, the Deputy Secretary of Defense directed these services to integrate their respective efforts into a joint Light Armored Vehicle (LAV) program. Through a Memorandum of Understanding, the Department of Army's Tank Automotive Command (TACOM) located in Warren, Michigan, was given overall contracting and acquisition authority and a Program Management (PM) office was established at that location, headed by a Marine Corps officer. Current program milestones are as follows:

Milestone	Date
Completion of vehicle testing	May 1982
Award production contract	July 1982
First production vehicle	July 1983
Initial Operational Capability (IOC)-Marine Corps	November 1983
First unit equipped-Army	April 1984

Program Problem Areas

While the LAV program began as nonmajor, nondevelopmental unilateral efforts on the part of the Marine Corps and the Army to acquire "off-the-shelf" vehicles, it appears to be developing into a major acquisition program with some significant problems, i.e., inadequate and redundant testing, concurrency, requirements turbulence, as well as high cost. Available estimates indicate DOD plans to expend approximately $1.6 billion for procurement of 3,059 light armored vehicles between FY's 1983 and 1988.

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Discussed below are some of the major program deficiencies identified through this review.

1. Testing Process Abbreviated, Inadequate, and Being Conducted on What Are Actually Prototype Vehicles

In September 1981, following integration of the Marine Corps/ Army programs, competitive development contracts were awarded to the following firms to provide vehicles for testing:

-- Alvis, Ltd., Coventry, England
-- Cadillac Gage Division, Ex-Cell-O Corp., Warren, Michigan
-- General Motors of Canada, Ottawa, Ontario

While the candidate vehicles are supposedly "off-the-shelf," none of the competing manufacturers has ever produced an item exactly like the ones now being tested. Thus, all indications are the military services have abandoned or were less than serious about utilizing off-the-shelf equipment to satisfy their needs.

In November 1981, these firms delivered, ostensibly off-the-shelf, vehicles for joint Army/Marine Corps testing to the Marine Corps facility at 29 Palms, California.

In order to award a production contract in FY 1982 and meet the Marine Corps goal of having an initial operating capability by November 1983, the candidate vehicles are being subjected to an "accelerated" test program, i.e., testing began before either the vehicles or the troops testing them were ready. It is fairly obvious that the test vehicles will not represent the manufacturer's final product. Halfway through the testing, each of the manufacturers delivered a new vehicle which differed in certain respects from the one initially provided. For example, ALVIS used a different cooling system, transmission and up-powered the engine on its second test LAV. In addition, should ALVIS be the successful contractor, its production LAV would incorporate additional changes involving turret drive, bilge pumps, winch, alternator, and other items. Moreover, none of the candidate vehicles had been previously equipped with their primary weapon and associated stabilization systems, i.e., the 25mm chain gun (light assault vehicle) or the 90mm Cockerill (assault gun vehicle). Examples of other differences from previously produced vehicles include:

-- One Cadillac Gage vehicle is a "stretched" version of an earlier vehicle configuration.

-- The ALVIS vehicle has an engine and transmission that had not been used on previously produced models.

-- The General Motors vehicle has eight wheels while previous configurations had only six wheels.

In a departure from normal test procedures, the Army and Marine Corps troops testing the candidate LAV's had no experience

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with the vehicles before testing began. Testing officials report that it usually takes a few months for the troops to gain the experience needed to effectively operate the LAV's, and as a result, early test data was not as useful as it could have been.

Under the best of circumstances, effective evaluation and interpretation of test data is extremely difficult. In this case, with vehicle changes and lack of troop training complicating the situation, the assessment of accumulated test data will be even more difficult and subjective.

Additional joint service testing with the vehicle eventually selected will be required because the accelerated program does not provide sufficient reliability, availability, maintainability, and durability (RAM-D) data. RAM-D testing after contract award will likely identify deficiencies which were not evident due to the compressed nature of the selection schedule, these ramifications may cast doubt on the viability of the vehicle selected as well as require increased funding to correct.

Moreover, at the time the Army and Marine Corps programs were joined by OSD, the Marine Corps was already soliciting industry for test vehicles. This separate effort continued without modification under the joint program. The Marine Corps, of course, was not requesting vehicles in the configurations thought necessary by the Army and as a result, a potentially expensive and redundant testing process will be undertaken solely for Army configured vehicles. These tests, conducted at an Army site, will not occur until after the contract is awarded and will involve only vehicles, of a type, provided by the winning contractor.

2. Army Uncertain of Light Armored Vehicle Requirements

The MPG-N and LASC, which the Army plans for procurement as part of the LAV program, appear to be unsuitable for the newly conceived mission of Army's light infantry division. Requirements documents, prepared by significant Army organizations tasked with establishing armored vehicle requirements, manifest major conceptional differences in the characteristics and capabilities of vehicles believed necessary to fulfill these roles.

The U.S. Army Training and Doctrine Command (TRADOC) is the Army agency normally responsible for establishing armored vehicle requirements. Accordingly, it established the Army's official vehicle requirements for the LAV program based primarily on inputs from its Infantry Center at Fort Benning, Georgia. The vehicle characteristics thus established differ, however, considerably from those recently proposed by the 9th Infantry Division at Fort Lewis, Washington. This division is the site of the High Technology Test Bed (HTTB), previously discussed in the Investigative Staff's report of February 1982, on Armored Programs of the Army and Marine Corps. It was specially established by the Army Chief of Staff to develop doctrine and tactics for light forces, evaluate off-the-shelf light armored vehicles, and develop requirements for new light armored vehicles.

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A review of proposed 9th Infantry Division Required Operational Capability (ROC) documents for light armored vehicles indicate that the characteristics of the MPG and LASC vehicles planned for procurement in connection with the LAV program are not compatible, at least with that organization's concept of light infantry doctrine and tactics currently under development. An excerpt from the proposed 9th Infantry Division ROC for a personnel carrier states:

> "* * *The Infantry Fighting Vehicle (IFV), organic to the mechanized divisions, and the projected Light Armored Squad Carrier, are too heavy to permit rapid deployment to any area of the world. * * * Further, with the advent of 'smart munitions,' an armored personnel carrier of 10-11 men offers a lucrative target. This indicates the desirability of dispersing the squad between two vehicles."

Additionally, this draft ROC proposes that these vehicles be of a size which would permit the transportation of six of them on on a single C-141B aircraft. The size and weight of the proposed LAV vehicles permit transport of only two vehicles per aircraft.

Clearly, officials at the 9th Infantry Division believe that any new light armored vehicles should be substantially lighter and more transportable than any of the LAV vehicles currently under consideration.

After the 9th Infantry Division circulated its draft ROC for a personnel carrier, the Army decided to reevaluate its LASC requirement. Only the LASC is being reevaluated because apparently the Army is already "committed" to buying the MPG whether it meets its requirements or not. The Army plans to complete the reevaluation of the LASC by June 1, 1982--prior to the LAV contract award. The reevaluation is to consider light armored vehicle capabilities and characteristics proposed by both TRADOC and the 9th Infantry Division, and light vehicle test reports, as well as emerging studies of organizational and operational concepts.

The Army's study of LASC alternatives will reportedly also consider using the current M113 armored personnel carrier for the personnel carrier role. When the requirement for a personnel carrier for light infantry divisions first surfaced, TRADOC officials recommended using a modified M113 based on previous testing of a modified M113 with increased speed and agility. The Army Staff rejected the M113 option and characteristically began an acquisition program for a new armored personnel carrier instead. As indicated in the February 1982 Investigative Staff report on the Procurement Practices of DOD and noted again below, the M113 and the proposed LASC have similar characteristics.

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Designation/ Acronym	Status	Troop Capacity	Weight (tons)	Can Swim	Armor Protect. Level	Speed Road/CC (mph)	Unit Program Cost Est. ($000)
M113 ---	In Serv	12	13	Yes	7.62	40/19	$152
LASC ---	Dev	9-11	14.5	Yes	7.62	50/?*	438

* No cross country (CC) speed specified in requirements.

3. Marine Corps Requirements Also Apparently Changing

Although Marine Corps planning for increased armored capability included the requirement for both light assault (LA) and assault gun (AG) vehicles and both are currently being tested, emphasis seems to have shifted to the light assault vehicle. This shift may be due to a developing controversy concerning the gun size required on the assault gun vehicle. Present program plans indicate that the assault gun vehicle will be armed with a 90mm Cockerill cannon made in Belgium. However, also under consideration are a modified 105mm cannon and a brand new 75mm gun which will require development. In any event, the production of the assault gun vehicle is not planned to begin until 1986 and its priority appears to have been diminished.

4. Procurement Proposals Indicate Uncertainty of Military Services

The current uncertainty regarding vehicle types and procurement quantities for the planned 5-year LAV multiyear contract, to be awarded in July 1982, provides further evidence that neither of the program participants has a firm idea as to exactly what types of vehicles are really required. The LAV program "Request for Proposal" is focused on only the MPG-N for the Army and the LA vehicle for the Marines. Competing contractors are to provide two alternative bids--one with and one without the LASC for the Army. Both contract alternatives treat all proposed Marine Corps variants--except the LA vehicle--as options. Marine Corps officials state that variant options not developed would be procured as additional LA vehicles and the overall quantity would remain the same. The following chart indicates the contract alternatives.

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CONTRACT ALTERNATIVES FY 1984-86
LAV VEHICLE TYPES AND QUANTITIES

	Alternative A	Alternative B
Marine Corps		
Light Assault	289	289
Other Variant Options	391	391
Army		
Mobile Project Gun	680	680
Light Armored Squad Carrier	645	0
Recovery	130	0
Total	2135	1360

5. Schedules Continually Changing

Because of the apparent confusion in requirements, testing, and contracting, the proposed acquisition schedule has been continually changing. The following chart indicates the changes which have occurred in the 4-month period from October 1981 to February 1982, and depicts the change in vehicle quantities for the Army, the shift in Army emphasis to the MPG-N, and the delay in procurement of the LASC vehicle. The increased Marine Corps emphasis on the Light Assault Vehicle and the associated deemphasis of the Assault Gun Vehicle is also indicated. It should be noted the Army's planned procurement includes two complete POMCUS sets, even though the stated purpose for purchasing these vehicles is allegedly to obtain rapid deployability in contingency operations.

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LAV PROGRAM PROCUREMENT PROFILE
PLANNED VEHICLE QUANTITIES BY FISCAL YEAR

	FY 82	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88	Total
ARMY								
Initial Schedule October 23, 1981								
MPG -----	-	57	86	112	103	92	-	450
LASC ----	-	115	229	250	256	287	-	1137
Recovery	-	17	30	34	41	35	-	157
								1744
Revised Schedule January 15, 1982								
MPG ------	-	49	132	113	139	139	-	572
LASC -----	-	195	245	359	325	312	-	1436
Recovery -	-	27	38	51	46	51	-	213
								2221
Revised Schedule February 17, 1982								
MPG ------	-	175	200	240	65	-	-	680[1]
LASC -----	-	-	173	173	299	520	287	1452[2]
Recovery -	-	-	51	35	44	53	-	183
								2315
MARINE CORPS								
Initial Schedule October 23, 1981								
LA --------	45	57	38	49	50	50	-	289
AG --------	-	-	-	46	46	46	-	138
Recovery --	-	-	10	7	8	8	-	33
Others ----	-	-	49	77	78	80	-	284
								744
Revised Schedule January 15, 1982								
LA --------	60	134	60	35	-	-	-	289
AG --------	-	-	-	27	62	49	-	138
Recovery --	-	-	13	0	20	-	-	33
Others ----	-	-	68	54	147	15	-	284
								744
Revised Schedule February 17, 1982								
LA --------								
AG --------			No Change from Previous Schedule					
Recovery --								
Others ----								

[1]Includes acquisition of two POMCUS sets, beginning with FY 85 buy.
[2]Includes acquisition of two POMCUS sets, beginning with FY 87 buy.

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Report of May 18, 1982

NAVAL AIR LOGISTICS COMMAND MANAGEMENT INFORMATION SYSTEM (NALCOMIS)

NALCOMIS is a management information system being designed to automate the Naval Aviation Maintenance Program and associated supply support functions. It is proposed for installation at 98 major Navy and Marine Corps sites, primarily aircraft carriers and air stations. Full implementation will encompass 800 computer programs and one million lines of coded information, which will require the procurement and installation of 1,000 minicomputers and 15,000 terminals.

Under development for 10 years at a cost of at least $30 million the system is expected to take another eight years and $500 million to complete. NALCOMIS not only has been a costly and lengthy development, but its implementation will be complex and expensive with life cycle costs approximating $2.5 billion in FY 1981 dollars.

The vastness of the system, as well as time and money issues have attracted the attention of the Office of Management and Budget, the Office of the Secretary of Defense, the Naval Audit Service and various Navy officials. In particular, the Office of Assistant to the Secretary of Defense for Review and Oversight and the Naval Audit Service have called for the discontinuation of NALCOMIS development and the substitution of another automated system. The Naval Audit Service report claims that the China Lake Naval Weapons Center has developed an operational system which could, with expansion, encompass the NALCOMIS objectives quicker and for less cost.

The Chief of Naval Operations (CNO) disagrees and remains fully committed to NALCOMIS. He feels that the Naval Audit Service has failed to adequately assess both the advanced state of NALCOMIS development and the ability of China Lake's system to expand into a NALCOMIS system in a timely and less expensive manner. Because of disagreement the issue has been elevated to the Assistant Secretary of the Navy for Financial Management for resolution.

Since its inception the NALCOMIS project has suffered from poor management including the inability to reconcile fleet requirements. However, the past six months have seen significant improvement in overall project management which should result in completion of software development and an operational test of NALCOMIS beginning by January 1983.

There is a legitimate need in the fleet for an automated aviation maintenance management information system such as NALCOMIS. Therefore, because of continued NALCOMIS delays there has been a proliferation of interim systems to meet select operational needs. The primary example is the Atlantic Fleet's Status, Inventory, Data Management and Supply Support system which homes in on two

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critical issues, reparables management and supply support aboard aircraft carriers.

It is believed neither the NALCOMIS advocates or the critics have made the appropriate in-depth analyses of fleet aviation maintenance requirements, the state of NALCOMIS's current development efforts, or the capabilities of interim and alternative systems which might now perform some of the functions expected of NALCOMIS. Among the factors that need to be assessed include, (1) the high probability that NALCOMIS software will be ready for test in January 1983, (2) despite the Naval Audit Service report, NALCOMIS and China Lake's system have not been adequately compared, and (3) interim system development has lacked proper coordination and control.

In view of the above, the Committee may wish to consider directing the Secretary of the Navy to hold development of all aviation maintenance management information systems in abeyance until the Navy conducts a comparative review of NALCOMIS and interim or alternative systems in existence or under development. Because work stoppages on systems efforts of this magnitude are extremely disruptive, the review should not extend over a long period. It is believed that an ad hoc group of independent, unconstrained ADP professionals should be capable of conducting a review sufficient in comprehensiveness to make the appropriate decisions in approximately 2 months. If the system is not a "pipe dream" and can actually be developed and fielded, goals, objectives, and decision point milestones for acceptance or rejection of subsystem develop efforts, etc., must be defined and broken down to the point where a clear measure of progress can be determined prior to the time the next step in development is undertaken--all within the framework of an overall system's objectives and design. In addition, a plan should be developed where top level (CNO, Secretariat) management review of system progress is periodically conducted and where decisions for continued effort or termination are made on a prescheduled basis. Because of the high level of effort, resources, and time that have gone into NALCOMIS development, with highly questionable results, only with exceptional management effort, control, and professional expertise will the system ever reach a successful state of development.

The Naval Air Logistics Command Management Information System (NALCOMIS) is defined as a fully integrated automated management information system. Its purpose is to improve and sustain Naval aircraft readiness via efficient and effective execution of the Naval Aviation Maintenance Program (NAMP) functions as they apply to shipboard and air station aviation maintenance and supply areas for the Navy and Marine Corps.

NALCOMIS has been a complicated 10 year effort by the Naval Air Systems Command to design and develop a computerized system to replace the existing manual and semi-automated system for aviation maintenance data collection and reporting. This task requires

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800 computer programs with about one million lines of coded information to integrate the myriad of aviation maintenance functions involved in the NAMP, and involves the use of 1,000 minicomputers and 15,000 terminals. Added to this is the difficulty of implementing the system in a coordinated fashion throughout the Navy at 98 major sites, afloat and ashore. Installation, which will occur on aircraft carriers and amphibious helicopter assault ships, and at Navy and Marine Corps air stations beginning in 1984, is not expected to be completed before 1990 at the earliest.

To date NALCOMIS development has cost about $30 million and it is expected that another $500 million will be spent in system development and implementation. NALCOMIS life cycle cost is expected to be about $2.5 billion in FY 1981 dollars over a 22 year period.

Requirements

Management of the Navy's approximately 5,000 aircraft is a difficult task made more difficult because a large percentage are deployed world-wide for extended periods on aircraft carriers. With aircraft valued at $23 billion and spares at $3.4 billion, the Navy's aviation assets would rank fourth in dollar value if compared with the respective capitol equipment assets of "Fortune" magazine's top 500 industrial corporations. Viewed at the basic operating level, Navy budget figures indicate that one nuclear aircraft carrier at today's replacement or production cost would conservatively be $3.5 to $4.0 billion. One carrier air wing--the nine squadrons deployed on a carrier--numbering approximately 87 aircraft (including initial spares) would be $1.5 to $2.0 billion. Thus the cost of one nuclear aircraft carrier, combat equiped, would total about $5 to $6 billion.

This perspective can be honed further through an overview of the carrier's supply and aviation maintenance responsibilities. On an average deployment, supply personnel must stock and account for approximately 80,000 onboard aviation repair parts in varying quantities, and control the use of 12,500 items of test equipment and tools. The ever increasing complexity of Naval aircraft and components also dictates that thousands of pages of repair manuals and other records must be maintained and kept current.

The Navy contends that the dollar value of these assets and the sheer volume of transactions and records makes it virtually impossible to adequately manage them without an automated management information system. NALCOMIS was conceived in response to these conditions. The Navy claims automation is needed for the following reasons:

- Increases in aircraft complexity
- Decreases in personnel ceilings
- More stringent controls on high cost assets
- Expansion of information needs at all levels of Navy

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- Continuation of present austere funding environment
- Deterioration of the current manual and semi-automated system.

Of all the sites where NALCOMIS will be located, it is the aircraft carrier which is the most critical. Carrier operations during deployment are front line operations demanding around-the-clock time-critical maintenance decisions. In addition, maintenance personnel on the flight deck as well as below operate in a hazardous, space constrained environment which puts a premium on accurate and timely communication and efficient scheduling. Project officials agree that NALCOMIS must work in this environment in order to effectively respond to Navy operational readiness needs.

NALCOMIS Development

As a result of a two year study concluded in 1972, the Chief of Naval Operation's Carrier Aircraft Maintenance Improvement Task Force established the Shipboard Aviation Command Management Information System. In 1974 the effort was expanded to include automation of shore facilities. This all encompassing project evolved into NALCOMIS.

In the same year the CNO established the Fleet Oriented Review Committee Evaluating NALCOMIS to ensure user participation in the design, development and implementation of the system, but it was 1976 before the Navy began to focus on objectives. Prior to this time the NALCOMIS concept was almost unlimited in scope. Attempts were made to automate all levels and aspects of the Naval Aviation Maintenance Program. However, by 1976 it was clear to all that this was an impossible task.

A decision was made to limit NALCOMIS programs to supply and maintenance functions at a specific site rather than link all sites to a central system. Under this concept NALCOMIS would tie the maintenance activity of each squadron with the centralized maintenance and supply support areas--aboard a carrier or at an air station. Operating in this fashion NALCOMIS purportedly would increase the number of mission capable aircraft by accelerating maintenance, and by reducing inventory loss and the burden of manual record keeping.

In 1977 the Naval Air Systems Command established NALCOMIS as a major project office and the NALCOMIS Automated Data System Development Plan (ADS) was approved by the Assistant Secretary of the Navy for Financial Management (ASN/FM). Approval was contingent upon three stipulations. The first was that prototype testing be conducted at Cherry Point Marine Air Station instead of a West Coast site. The second tied NALCOMIS minicomputer procurement to the Navy's Shipboard Nontactical Automated Data Processing Program (SNAP) in order to ensure that fleet hardware was standardized and compatible. The third stipulation stated that hardware would not be installed at any other site until the

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Cherry Point prototype system had been approved by the senior Navy ADP policy official (i.e. the ASN/FM).

At the time of approval the ASN/FM noted that NALCOMIS was going to involve a sizeable capital investment over a 10 year period and that procedures were needed which would measure expected NALCOMIS benefits. In addition, the ASN/FM noted that because of the size and complexity of NALCOMIS the project manager's attention must be directed to efficient system design and application program reliability and maintainability.

Between 1977 and 1981 NALCOMIS experienced numerous delays in both hardware and software development as shown below.

NALCOMIS MILESTONE SLIPPAGE

Event	Original Milestone Date	Current Projected Milestone Completion	Slippage
Program Specifications	Sep 78	Apr 82	3 yrs 7 mos
Applications Specifications	Jun 78	Oct 82	4 yrs 4 mos
SNAP Hardware Award	Jul 78	May 82	3 yrs 10 mos
Prototype Hardware Operations Commence	Apr 79	Jan 83	3 yrs 9 mos
Prototype Certified	Dec 80	Jan 84	4 yrs 1 mo
First Fleet Operating Site	Apr 80	Apr 84	4 yrs
Full Implemented System	FY 84	FY 90	6 yrs

Many of the problems and resultant delays were caused by poor management. Following the 1976 reduction in scope, NALCOMIS development proceeded under the concept of a single processor and integrated data base at each of the 98 sites. However, in 1981 it became apparent that NALCOMIS would not work under this concept. Three major problems were noted:

(1) NALCOMIS had grown so much that the single processor would not handle all the data files required or the volume of transactions expected.

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(2) Response time could be unsatisfactory in an operational environment such as an aircraft carrier or a "master jet base" where the number of squadrons and volume of transactions at peak times is extremely high.

(3) The use of a single processor did not facilitate the orderly transfer of records for squadron deployability from one station to another.

In essence, after 10 years of development effort it was discovered the single central processor system would not meet the major criteria established by the CNO at the program's inception--to meet the needs and requirements of the fleet.

A major redesign was required. The change involved going from a single centralized processor with an integrated data base for each of the 98 sites to a "distributive" system which utilizes independent processors at each squadron with its' own unique data base. This redesign concept provides a flexible modular approach to implementation and should improve user response times, add flexability for squadron deployability, and improve protection against system failure.

Another management problem concerned designation of the Fleet Material Support Office (FMSO) as the Central Design Activity (CDA) for NALCOMIS in 1978. In reality the project manager split the CDA responsibilities between FMSO and a contractor on the west coast; the former responsible for system design, the latter for programming. Complicating the matter further was the fact that the contractor reported directly to the NALCOMIS project office rather than FMSO. FMSO was finally given full authority and responsibility as CDA in 1981.

A related problem concerned fleet or user requirements. It was recognized early that FMSO would need aviation maintenance billets assigned to provide the aviation flavor or user orientation. Despite being named CDA in 1978 it was not until 1980 that FMSO received one aviation maintenance officer out of the ten billets it felt were required. This lack of aviation input resulted in initial failures of NALCOMIS software during actual tests with a Navy Reserve patrol squadron. FMSO has since hired civilians with Navy aviation maintenance background and has turned around its software failures.

Other problems, such as the selection of hardware for NALCOMIS, were beyond the control of the project office. The ASN/FM decision to tie procurement of NALCOMIS automated data processing hardware with the SNAP procurement managed by Naval Sea Systems Command added still another organization to NALCOMIS's already overtaxed coordination effort. Additionally, the SNAP project office has a coordination problem equal in magnitude to NALCOMIS. The SNAP hardware procurement award date of November 1979, has been delayed to at least May 1982. Thus, software development was forced to near completion prior to hardware selection.

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In October 1981, a new project manager was assigned. Decisions have been made to go to the "distributive" system and to institute new technology efforts to improve software program productivity. All consideration of further system growth has been stopped, FMSO has been given full CDA authority, and firm dates have been established for the delivery of NALCOMIS software. Delivery of complete software is now scheduled for December 1982, with prototype operations to begin in January 1983. While overall management has been improved, some problems still exist. There have been three project managers since 1977 and each change has caused disruption. Although the project management staff now consists of five professionals, Navy officials suggest that an automated data processing project of this size and complexity should be four times as large.

Another problem is that NALCOMIS cost figures are not firm. They are contingent on a SNAP contract award which has yet to be made. Currently, dealing with 1981 figures, Navy expects NALCOMIS development and implementation to cost about $530 million. Life cycle costs covering a 22 year period are expected to be $2.5 billion in FY 1981 dollars. Under the ADS plan life cycle cost is used to justify NALCOMIS whereas current DOD/Navy instructions use life cycle cost considerations to help make key program decisions at each milestone. A "grandfather" clause allows NALCOMIS to be excluded from the current DOD/Navy instructions.

From its inception NALCOMIS has been a major automated data processing project which should have received high-level Navy visability and review. The NALCOMIS ADS plan, however, has not provided the visability and review which could have prevented some of the mismanagement. Navy officials admitted that the ADS plan, which is updated annually, is rarely used as a management tool for system development and is inadequate for project review and oversight, especially for a project the size and complexity of NALCOMIS.

Important questions, especially those dealing with cost, remain to be answered. The current DOD/Navy life cycle cost management process provides a means by which these questions would be reviewed at high-levels. NALCOMIS, if it were utilizing current life cycle management guidance, would be subjected to periodic reviews which would serve to prevent a recurrence of poor management and help to insure adequate oversight, especially in the area of cost. Some of the critical issues which would be covered at each review or milestone include mission need, and a determination that the system satisfies the design and functional requirements; that life cycle cost estimates are realistic and acceptable; that tradeoffs have been made to balance cost, schedule and performance; and that the project is being supported and managed properly; and that all alternatives have been considered.

The next milestone for NALCOMIS is prototype certification, but no specific criteria or requirements exist which must be met in order to proceed. Notwithstanding the lack of criteria, NALCOMIS cannot be implemented until prototype certification has

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been approved by the ASN/FM. Under these conditions, this will be a purely subjective decision on the part of the ASN/FM.

Interim and Alternative Systems

Today, 10 years after the CNO's initiative to automate naval aviation maintenance, officials of both the Atlantic and Pacific Fleets continue to stress the urgent need for an automated management information system. Long promised, NALCOMIS continues to be delayed, so much so that the fleets have developed and procured interim systems on their own in order to meet critical aviation maintenance needs. These systems range from desk top computers approved by a ship's Captain to an interim system which is operational on aircraft carriers in the Atlantic Fleet.

The full scope and cost of interim system proliferation is unknown to the Navy. Some of the systems have development and implementation costs below the monetary thresholds which would make them visable. Additionally no single Navy element has the responsibility to insure that NALCOMIS development is coordinated with that of interim systems. Navy officials estimate that there could be up to twenty or more of these systems which deal with some aspects of aviation maintenance. The current practice of the fleets to procure and develop interim systems with their own funds is selfdefeating because it frustrates Navy efforts to standardize.

During the past year NALCOMIS time and money issues have attracted the attention of the Office of Management and Budget, the Office of the Secretary of Defense, the Naval Audit Service (NAS) and various Navy officials. In particular the Office of the Assistant to the Secretary of Defense for Review and Oversight, and the NAS have called for discontinuation of NALCOMIS development. The NAS has gone further by recommending the substitution of another automated system which is claimed to be further advanced in development.

The NAS report on NALCOMIS claims that the China Lake Naval Weapons Center has developed an operational system which could, with expansion, encompass the NALCOMIS objectives. The China Lake system was conceived as a versatile aviation training computer system which has been adapted in part to aviation maintenance.

The NAS asserts that utilization of the China Lake development could expedite implementation of the management information system objectives by at least 8 years; reduce life cycle investment costs a minimum of $272.2 million; and provide the aircraft community a more manageable and versatile system. The NAS recommended that the CNO discontinue further development of NALCOMIS and adapt China Lake's system to the NALCOMIS objectives.

The Chief of Naval Operations has questioned NAS claims regarding the utilization of the China Lake system. His questions included the validity of unverified contractor cost estimates,

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the possible incompatability of shipboard nontactical automated data processing systems, the potentially disasterous effect on the SNAP procurement, the totally unrealistic site activation costs, and the effect of recent NALCOMIS project management initiatives which are intended to substantially accelerate project completion.

In addition, if China Lake's system replaced NALCOMIS, China Lake officials speculated it would require at least several additional years to complete and enhance their existing system, to document the completed portion of their system, and to address many of the issues already addressed within the NALCOMIS development, including site surveys, implementation schedules, testing plans, and life cycle management criteria. They further noted that a China Lake staff of approximately 30 would be required to effectively manage the increased workload and the hundreds of millions of dollars in additional contracted work.

An investigative review revealed still more deficiencies in the NAS recommendations. Both primary NAS findings, earlier implementation by 8 years and cost savings of $272.2 million, are heavily contingent upon an implementation schedule mandating completion within 3 years. To obtain this result many prudently consecutive tasks must become concurrent. During this period--while the China Lake system is still under development to replace NALCOMIS--NAS recommends the following tasks be performed simultaneously:

- Installation and implementation at all 98 major sites.
- Program testing and rework.
- User training
- Program maintenance and updating.
- Documentation of program development (both previous and current).
- Development of life cycle management criteria.

In addition, the NAS does not address the potential conversion costs and delays which could result from the competitive procurement of hardware incompatible with that currently used by the China Lake system.

In rejecting the NAS recommendation the Chief of Naval Operations noted that he remained fully committed to NALCOMIS and claimed that NALCOMIS will provide a "quantum improvement in the management of aircraft maintenance in the fleet." Because of disagreement the issue has been elevated to the ASN/FM for resolution. It is understood the ASN/FM's office plans only to address the comparison of China Lake's system with NALCOMIS, and not the issue of interim system proliferation.

Indications are, however, that the Atlantic and Pacific Fleets are in the process of establishing a joint position on continued NALCOMIS development and the use of interim systems. The review by the ASN/FM's office should be expanded to assess the quetionable growth and financial consequences of the proliferation of interim systems.

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The Atlantic Fleet operates an interim system known as the Status, Inventory, Data Management and Supply Support System (SIDMS II). Currently implemented on six carriers, it is designed primarily to operate within the intermediate maintenance work area and interface with each of the carrier's nine squadron maintenance control offices and the main supply support center. SIDMS II compliments the present manual and semi-automated NAMP systems by providing on-line information to users.

Homing in on the critical issues of reparables management and supply support, SIDMS II objectives are to expedite repair of items, improve turnaround time for reparable assets, improve management of the rotable parts pool, and reduce supply response times. Secondary objectives include improving personnel utilization, and material/equipment management.

During SIDMS 7 years of development, it experienced several failures and a variety of problems, however, project officials persisted, and have overcome most of these difficulties. While still learning how to use SIDMS, aviation maintenance personnel are very enthusiastic over initial results. Preliminary data analysis indicates operational readiness improvements of at least 8 percent in mission capable aircraft and of at least 12 percent in fully mission capable aircraft. Fleet officials are confident of these figures and have noted that users onboard the carriers are also beginning to see improved resource and personnel management. SIDMS II is capable of limited expansion but not nearly that which would be required to replace NALCOMIS.

Analysis

The situation with NALCOMIS appears to typify problems that have been recognized in previous Investigative Staff reports. In particular, in a May 1981 report to the Committee, Effectiveness and Operations of the Naval Data Automation Command, it was noted that top level visibility and management of ADP systems in the Navy (CNO level) is lacking and that there is little standardization across, or in many cases, within, Navy command lines. The proliferation of "make do" systems by concerned parties from ship captains to weapons' center commanders illustrates the lack of any centralized control over Navy ADP systems development. Further compounding the problem is naval Air Systems Command's (NAVAIR) inability to mount an effort of this magnitude due to its relatively limited Central Design Activity (CDA) personnel resources. Although the requirements for the system are principally oriented toward the management of items that relate to aircraft (although closely coupled with supply-oriented activities), the development of the system has been placed in the hands of the Fleet Material Support Office (FMSO), the CDA for the Naval Supply Systems Command, (NAVSUP).

While the resources of FMSO are much greater than those of NAVAIR's CDA, the situation is not ideal as NAVSUP is only tangentially concerned with the problem and is not directly in

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the naval air logistics or fleet chains of command. While FMSO's capability to do the job may not be of issue (if indeed the job is capable of accomplishment at all) its organizational location may contribute to management and control problems in the future.

Five hundred and thirty million dollars is an extremely high price for the development and implementation of an automated system. The Navy appears to be at odds as to what constitutes a well-grounded course of action to meet the need for an aviation oriented logistics information system. The Investigative Staff has reported on at least one other automated information system of this magnitude which consumed inordinate amounts of resources and resulted in disaster--the Air Force's Automated Logistics System (ALS). NALCOMIS, because of its size, complexity and lack of proper management and control has the potential for becoming another ALS. the possibility of wasting $500 million is certainly deserving of the highest level of command attention in the Navy to insure: (1) the Navy's needs <u>are</u> met, and; (2) the funds are not wasted on design and development efforts which never reach a successful conclusion.

That an automated information is needed in the area of naval air logistics is not questioned. Whether the Navy has "scoped" the problem to the point that it knows where it is, or what it truly needs is very questionable. What is required is the institution of a high level, high powered independent management review of NALCOMIS and its objectives. Because work stoppages on systems efforts of this magnitude are extremely disruptive, the review should not extend over a long period. It is believed that an ad hoc group of independent, unconstrained ADP professionals should be capable of conducting a review sufficient in comprehensiveness to make the appropriate decisions, in a matter of approximatley two months. If the system is indeed capable of accomplishment, goals, objectives, decision point milestones for acceptance or rejection of subsystem develop efforts, etc., must be defined and broken down to the point where progress can be clearly defined before the next step is undertaken--all within the framework of an overall system's objectives and design. In addition, a plan should be developed where top level (CNO, Secretariat) management review of system progress is periodically conducted and where decisions for continued effort or termination are made on a prescheduled basis. Because of the high level of effort, resources and time that have gone into NALCOMIS development to date with highly questionable results, only an exceptional management effort manifesting control and professional expertise will bring the system to a successful state of development.

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Mr. ADDABBO. At this time I wish to publicly express my gratitude to the Surveys and Investigations staff for all the hard and detailed work they have expended on this study. This report will serve as a third source of questions for this hearing.

One of the major new acquisition initiatives is multiyear procurement. Because multiyear procurement has a major impact on budget levels and program flexibility, the committee will schedule a separate hearing on this subject later, and we will not be discussing it today.

The principal witness today is Mr. William A. Long, Deputy Under Secretary of Defense for Acquisition Management. He is accompanied by supporting witnesses and representatives from the services.

Mr. Long, your prepared statement will be made a part of the record at this point and you may summarize it before we proceed to questions.

[The statement of Mr. Long follows:]

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Mr. Chairman and Members of the Committee:

I appreciate the opportunity to meet with you today to discuss procurement practices in the Department of Defense (DoD). I have with me Mr. Harvey J. Gordon, Assistant Deputy Under Secretary of Defense for Acquisition; Mr. Duard H. Little, Deputy Assistant Secretary of the Army (Acquisition); Mr. Everett Pyatt, Principal Deputy Assistant Secretary of the Navy (Shipbuilding and Logistics); and Major General Joseph H. Connolly, Director of Contracting and Manufacturing Policy, Department of the Air Force.

I am well aware of the Committee's vital concern with acquiring the requisite supplies and services to assure our national security in the most efficient and economical means possible. Surveys and reviews conducted for and by this Committee, along with reviews of the General Accounting Office, all have a common thread: to point out deficiencies and recommend corrective action. The goal is efficient and economical acquisition in support of national defense--a goal that we fully endorse.

This Administration has taken a number of initiatives to strengthen the management and eliminate waste and inefficiency in the DoD. I would like to discuss several of these initiatives with you today.

Major Weapons Systems Acquisition

Major systems developed for and acquired by the Military Services are the subject of much congressional and public scrutiny. This is only as it should be. The quality and quantity of these systems placed in the hands of our servicemen and women are key to their survival in a conflict and, therefore, to the security of all our citizens. We, therefore, must assure acquisition of effective systems for the dollars invested.

We have taken a hard look at the overall management process for acquiring major systems and determined that improvements can be made in the efficiency of this process. Let me make it clear that we in the Office of the Secretary of Defense are not vacating our overall management responsibility. However, we found that the process was overburdened with reviews and paperwork involving decisions that, in some cases, could best be left to the Services, permitting us to focus directly on the most critical matters.

The Defense Systems Acquisition Review Council (DSARC) process has been streamlined. Milestones have been reduced from four to two. Ten of the DSARC programs were delegated back to the Services when the dollar threshold for major systems was raised. In addition, six programs have had the Milestone I (demonstration/validation) or Milestone II (full-scale development) decision authority delegated.

The documentation required for DSARC milestone reviews has been drastically reduced. Milestone I data have been reduced from 70 to 15 pages, and Milestone II data have been reduced from 70 to 38 pages. The thrust has been to reduce the number of programs that enter the DSARC process to reduce the number of milestones a program is required to pass, and to reduce the documentation requirements for those milestones where the Secretary of Defense remains the decision maker. While accomplishing this, it is important to define and receive sufficient information in the DSARC process to allow an informed decision to be made. Toward this end, DoDD 5000.1, "Major Systems Acquisition," was published earlier this year, and DoDI 5000.2, "Major Systems Acquisition Procedures," is presently under discussion with the Services and, when issued in the near future, will reflect a reduction in required documentation.

Action was taken in FY 1982 to link the DSARC and Planning Programming Budget System processes more closely together. Last year, for example, the Defense Resources Board reviewed the FY 1983 Justification for Major System New Starts and approved 15 programs while disapproving four. This ensures better integration of the acquisition process with the budget process and serves to

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shorten the front end of the acquisition cycle by removing funding uncertainty at the beginning of development. This also helps in weeding out programs that cannot be justified before substantial funding is provided.

If I were to prioritize the many matters of concern with the process of acquiring major systems, program stability and cost growth would head the list. We have endeavored, in the matter of program stability, to strive for funding at the most appropriate economical rate of production. Cost growth is attributable to a number of interacting changes. However, lack of program stability and inflation have substantially contributed to cost growth. We are endeavoring to improve both cost realism and cost estimating by use of inflation indices more representative of expectation and budgeting to most likely cost.

Several of these matters are also tied in with the initiatives to improve the acquisition process.

DoD Acquisition Improvement Program

As you are well aware, the current management team, shortly after taking office, launched an intense comprehensive assessment of the acquisition process. The assessment sought to identify viable ways to reduce costs, to make the acquisition process more efficient and time sensitive, and to revitalize our defense industrial base, In April 1981 the findings and recommendations were incorporated into the DoD Acquisition Improvement Program with 32 Management initiatives.

In December 1981 we completed a detailed review of our progress during the first 6 months and issued the Acquisition Improvement Task Force Report. It addressed accomplishments, as well as identified barriers, and included proposed actions to overcome these barriers.

During the first 6 months of this year, we have worked to complete policy development in support of the initiatives. The Services likewise have taken similar steps to promulgate the new or revised policies in a form that can be used by the working levels in all their commands. My staff, along with the Acquisition Improvement Steering Group, is currently completing a 1-year report on our progress. I will provide a copy to you as soon as it is available.

We have made significant progress, but we have a way to go before the principles and policies of the initiatives are institutionalized throughout the Department. It takes time to adapt to change, and flow the effect down to the operating activity. While we are impatient to improve the acquisition process, we know that we are on the right track. It will require a continued effort on the part of all of us to achieve a full implementation of these initiatives.

In seeking our objective to institutionalize the initiatives, the Joint Logistics Commanders have formed a committee of two-star officers to overview their implementation. These officers will take the lead to ensuring that the program is pushed down to the working levels where the day-to-day decisions have to be made.

We are also taking a further step to ensure that the initiatives are being considered at the highest levels. The Deputy Secretary of Defense has developed new procedures that will identify for the Defense Resources Board all of the specific actions taken in the area of acquisition improvement, as well as economies and efficiencies by each Service in the prepration of their updated 5-year defense plan. This action will emphasize for top management our commitment to the initiatives and the management priciples included therein.

Within the DoD, we will work this multi-pronged approach over the next year to ensure that the intiatives and the policies that implement them become part of the acquisition process.

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Other Management Actions

The Secretary has taken action in other management areas to effect increased effectiveness and efficiency that impact the acquisition process.

- The Defense Resources Board has been strengthened with wider representation from affected offices, thereby, permitting more informed decision to be made.

- A Council on Integrity and Management Improvement has been established. The Council identifies and pursues management improvements, stimulates and acts as a forum for innovative management ideas, and assured follow-up to the results of audit, inspection, and investigation activities.

- A new Office of Review and Oversight has been established to help us attack fraud and waste on a high priority basis.

- A new Office of Management Policy has been established to help concentrate on overall management policy and monitor progress in our major initiatives.

- For a year now, the Secretary has held weekly program performance reviews. These sessions allow the Secretary to examine major DoD programs in detail, to become aware of problems in time to act, and to provide immediate guidance to responsible officials.

- Actions are under way to implement the procurement reforms directed by the President in Executive Order 12352, dated 17 March 1982, which implements much of the proposed Uniform Federal Procurement System.

In summary, we are confident that the initiatives and actions being taken will significantly improve the management of the acquisition process.

This concludes my formal statement. I will be pleased to answer your questions.

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RESEARCH AND
ENGINEERING

BIOGRAPHICAL DATA

William A. Long
Deputy Under Secretary of Defense
for Research and Engineering
(Acquisition Management)

William A. Long took office as the Deputy Under Secretary of Defense for Research and Engineering (Acquisition Management) on September 1, 1981.

Mr. Long was born in Cincinnati, Ohio on May 27, 1937. He attended St. Xavier High School and graduated from Xavier University with an A.B. Magna Cum Laude in 1959. Mr. Long's college education was interrupted for a two-year period during which he served on active duty with the U.S. Army. Following his graduation, Mr. Long attended the University of Pennsylvania, Wharton School of Business and received his M.B.A. degree in 1961. Mr. Long then enrolled in the Boston College Law School where he was awarded a LLB (JD) degree, Magna Cum Laude in 1967. He is a member of the California and District of Columbia Bars. His professional associations include membership in the A.B.A. Public Contracts Section.

Prior to his appointment, Mr. Long was a partner in Latham & Watkins. His activities were concentrated on business matters including securities, financing and government contracts. He has had extensive experience with the government acquisition process, including work on contracting for major systems. In his position as Deputy Under Secretary, Mr. Long serves as the principal advisor to the Under Secretary of Defense for Research and Engineering in all matters concerning management and policy for the Department of Defense acquisition process.

Mr. Long is married to the former Mary Jane McCarthy. They have six children, Pauliann, Augustine, Edward, Christopher, Michelle and Sean and reside in Bethesda, Maryland.

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SUMMARY STATEMENT OF MR. LONG

Mr. LONG. Thank you, Mr. Chairman.

Members of the committee, I am William Long, Deputy Under Secretary of Defense for Acquisition Management.

I appreciate the opportunity to meet with you and the members of the Committee and your staff today to discuss the DOD procurement practices.

The principal witnesses that I have with me are on my immediate right, Mr. Harvey Gordon, Assistant Deputy Under Secretary of Defense for Acquisition; on my left, Mr. Duard Little, Deputy Assistant Secretary of the Army for Acquisition; on my far left, Mr. Everett Pyatt, Principal Deputy Assistant Secretary of the Navy for Shipbuilding and Logistics; on my far right, Major General Joseph Connolly, Director of Contracting and Management Policy for the Air Force.

I know this will promise to be a free-flowing and wide-ranging hearing. I don't want to take up a lot of time on the prepared statement. However, there are a few points that I would like to emphasize.

We appreciate the concern of this Committee on matters related to acquisition and procurement, and it is fair to say that it is of paramount concern within the Department as well as the Committee, the GAO and others. I think we all have a common goal, which is efficient and economical acquisition in support of the national defense. That, I think, is a truism.

We have, as a new Administration, a number of initiatives in process. You alluded to the DOD Acquisition Improvement Program. An integral part of that is the streamlining of the major weapon systems acquisition process and the efficient utilization of the Defense Systems Acquisition Review Council (DSARC). This body consisting of OSD and Service representatives examine information with respect to the major systems and make determinations at various milestones as to whether to proceed to the next phase, at what point in time, and under what circumstances.

We have attempted, in connection with the DSARC process, to make it a more effective management tool, to reduce the number of decisions that need to be made and to reduce the information flow requirements of the process to insure that more meaningful and usable information is provided, rather than simply providing information for its own sake. Another important step in the major systems acquisition process is the linking of the DSARC process to the Planning Programming Budgeting System to assure that a number of beneficial results flow from the combination, one of which is that as new programs come into the system, they are funded at adequate levels.

Another key element is that we bring into the system only those programs in which we have a high degree of confidence and can fund through their life. There is a concern in many quarters that, from a financial and resource allocation standpoint, we have, in the past, tried to keep afloat too many programs. We have a difficult process, as you know, in assessing threats and coming up with effective systems to deal with those threats. At the same time, we

have resource limitations which we are trying to manage more effectively.

With respect to the DOD Acquisition Improvement Program itself, as you indicated in your opening remarks, Mr. Chairman, the Deputy Secretary of Defense did issue a memorandum on April 30, 1981. I think it would be instructive to spend a moment on the background of what led up to that memo.

The new Administration, upon taking office, determined that the last thing that was needed at the time was another overall review of the acquisition process. The process, as you know, has been studied many times by many different bodies over the course of many years. What was sought to be accomplished was not another review in depth, but rather a review of the prior studies in an attempt to take out of those studies the best elements in terms of management practices and principles. They could then be combined in a package that made sense to focus on the policies needed to create an atmosphere and an environment in which those initiatives could be effectively implemented, and then have follow-through on implementation itself. The attempt was, of course, to add stability in the specific programs that make up the overall defense program, to reduce costs, to improve the efficiency of the process, and to improve the industrial base.

There are 32 specific elements of that program which we will be dealing with through the course of the day. I will not go through all of the 32, but would like to refer to some of the major ones. For example, the increased use of Preplanned Product Improvement, to design our systems on an evolutionary basis.

The Chairman referred to multiyear procurement which we are not going to discuss in detail today, but which is a very key element to the overall program. Others include increasing program stability whereever possible, recognizing that we do live in a dynamic and not static world; budgeting to most likely costs; encouraging capital investment to enhance productivity; improving systems support and readiness; budgeting for technological risk, providing additional funding for front-end test hardware, increasing competition; and increasing the program manager's visibility of support readiness.

I don't intend these examples to be my view of which are the highest priority elements of this program, but simply to reflect a representative sample of the kinds of things that we are interested in improving.

At the same time, we recognize that, just as our overall government is a vast institution, the Department of Defense is a vast institution, and organic changes are not easily or quickly made. They shouldn't be quickly made.

Just as our weapons systems development ought to be evolutionary, I think that, as we try to alter in a positive way the system by which we acquire goods and services, this process also ought to be evolutionary because fundamentally the system is basically sound. We can all point to instances in which the system hasn't worked, but I believe in the context of almost 13 million procurement actions a year, the vast majority of procurement actions are successfully accomplished in a reasonable time.

We can, as I say, point to examples where we have done things perhaps in a not-too-efficient manner, perhaps in an improper manner, but the system as a whole is basically soundly constructed and we do not in this Administration seek to discard an entire system and supplant it but rather improve an existing system.

What we are doing within the Department in connection with the Acquisition Improvement Program is a constant monitoring and review of the environment within which we function, and the policies that provide the atmosphere within which our people effect their acquisition and procurement activities. We are pushing down to the working level these management philosophies. Because of the size of the institution that does take time.

I think that, over the course of the past year and a few months, we have made a lot of progress. One can debate the numbers of dollar savings or cost avoidance in this or that program, but, by and large, I believe the system is working. As time goes on, the improvement program, together with some of the other initiatives which I referred to in my statement, will make a substantial improvement in the efficiency, speed, and propriety with which we acquire the supplies and services that our military departments need.

There perhaps can be some disagreement, as you indicated, Mr. Chairman, over specific elements of the program. We would be pleased to discuss them with you or with the GAO, or your surveys and Investigations Staff, or anybody else who has good ideas at any time.

We are not wedded to any particular program. We certainly know we do not have a lock on the expertise on matters relating to procurement, and if reviewers of GAO reports and our responses, or Surveys and Investigations Staff reports and our responses, believe they detect a somewhat cavalier attitude, I think that is a misperception.

We, as a Department, do take those reports very seriously. I think it is fair to say we sometimes disagree with the conclusions, but reasonable people can disagree on many matters in this field. The important thing is, we do have a common goal and that we are and ought to be working together to accomplish it. I believe we are on the right track. I don't think we have all the answers and we will be happy to discuss with anybody any ideas that they may have.

Let me now just terminate my opening remarks and I would be happy to receive your questions. To the extent we don't have specific answers to specific questions today, we will be pleased, of course, to supplement the record with written information at the appropriate time.

Thank you.

LATTA SUBSTITUTE BUDGET REDUCTION

Mr. ADDABBO. Thank you very much, Mr. Secretary.

Last week the House passed the so-called Latta substitute budget resolution. It included a three year reduction in defense of $30.7 billion in budget outlays.

The accompanying budget authority figure depends on which accounts within DOD's budget are reduced, but a good ballpark

figure for the budget authority reduction for defense assumed in the Latta substitute is $50 billion.

The Administration supported the Latta substitute.

I believe the $30.7 billion can almost be done in one year rather than three years, but that is a matter of opinion.

We know if this reduction is going to be made, it will not occur in the military personnel account. You have to pay the troops.

Although the tremendous size of the operations and maintenance account should enable the Congress to make some reductions in that area for lower priority programs, large scale reductions are unlikely in O&M because of its importance in readiness.

Many of the weaker programs in RDT&E are likely candidates for reduction, but R&D is a relatively small portion of the overall DOD budget.

Thus it is logical to assume that if significant reductions are to be made in DOD's budget to meet the defense outlay objectives included in the Latta substitute, those reductions will have to be made in procurement.

Do you feel that some major procurement programs will have to be eliminated if the expenditure ceilings for defense included in the Latta substitute, which was supported by the Administration, are to be met?

Mr. LONG. Mr. Chairman, I would like to respond initially and then ask my colleagues if they have any comments to add.

The Department believes, that the budget that was submitted initially is a sound budget in response to the defense guidance issued by the Secretary which in turn deals with threats and potential future events. We consider that the program encompassed in that budget is a sound program. We recognize that the Congress has the ultimate authority and responsibility for determining the actual amount of expenditures and obligation authority. If the budget does wind up in the range that your question has assumed, I think what we will do is, of necessity, go back and reassess our program completely to do the best job that we can to present as balanced a program as we can with the resources available.

We are concerned, as are you, and as you articulated, with the readiness posture. We feel, as a Department, that readiness has in some measure been ignored over the years and that is something we would not like to see terribly disturbed in the budget. The manpower levels in the near term are fixed. There could well be some force structure changes in the later years. The procurement account is subject to review just as other major elements of the overall program are. While there would probably be some changes in the procurement account, I can't at this point in time identify any specific target for either reduction or cancellation. I think our job as managers, both in OSD and in the Military Departments, is to do the best job we can from a Defense standpoint and from a management standpoint.

As I indicated in my opening remarks, program stability is a key element of the program; yet we recognize that the world is not stable, the world is dynamic. Threats change, budget levels change, and we recognize that we have to do the best job of stabilizing our critical programs from a management standpoint even though events around us may change.

So I think our game plan will be to effect the least instability to the least number of programs and that may well portend that some programs will be cancelled, although I don't have any specific candidates in mind. That is an overview without being specific in terms of what we will actually do, because I don't think we know what we will actually do.

We can only address the process we will apply from a planning standpoint. We will continue, as we are now doing in the 1984 budget preparation process and as we did in the 1983 budget preparation process, the management principles that we think are appropriate in the management of the Department. But we still have an overall operational obligation. We can't make decisions solely based on one driving element to the exclusion of all others.

We are advocating very strongly program stability. You may well see, however, that a stable program does have some perturbations because we have an obligation to present an overall Defense posture. All elements really tie in together.

If I may ask my colleagues if they have anything, any comments they would like to add to that?

Mr. LITTLE. I have nothing.

PROGRAM CHANGES BY DOD

Mr. ADDABBO. One of the problems we see with the reductions made in past budgets is DOD does not cancel programs which are not cost effective or which are not meeting specifications. Rather, DOD continues doing business as usual by stretching out other cost-effective programs.

Will we see more of this type of stretching out?

Mr. LONG. It would be folly for me to attempt to assure you that there will be none of that type of activity.

What I can assure you is that it will not be a sort of mindless business as usual. We have others that are over budget. We have others that are within budget. We have some programs in development where the specifications are very difficult to achieve, and we may fall a little short; but we still have to look at the substantive role of each of our programs in terms of its contribution to the overall Defense posture. To cancel a program without regard to its operational role, would be a mistake.

I do not pretend to be a military operating strategist or tactician. That is not my background; that is not my role. I am only talking about the management process. We have to look at all things. I think that there will be substantially greater effort than there has been in the past to avoid stretching out the so-called stable programs simply to finance other programs. I can't tell you that it will not happen. I can only tell you that if it does happen, it will be a management decision made only after the greatest level of attention at the highest levels in the Department.

Mr. ADDABBO. I think it is very important this matter be continually reviewed. We have seen numerous cost overruns that are actually occurring in many procurement programs. Because of these cost overruns and because of budgetary limitations, we see stretch out of productions which again do not give us cost effective buys.

Mr. ADDABBO. Later in the hearing we will be discussing the numerous cost overruns that are occurring in many procurement programs. To what extent do you anticipate that these numerous cost overruns will cause the "stretching out" of the production of other programs since paying for these cost overruns will "take away" funds from other programs, at the very time that reductions of tens of billions of dollars are to be made from the Administration's defense plan for fiscal years 1983-85?

[The information follows:]

All DOD programs constantly compete with one another for a fixed amount of resources whether it be funding, manpower, or test range availability. Cost overruns, out of necessity, will result in quantity reductions, program stretchout, or termination in either the program incurring the cost growth or in the programs with which it competes for resources. The extent to which stretchout or termination occurs is difficult to quantify since rebalancing occurs in all the phases of budgeting as well as at several DOD execution echelons.

EXAMPLES OF NONECONOMIC PRODUCTION RATES

Mr. ADDABBO. If I may just give one of a thousand examples, the Army's DIVAD gun system was designed for an economic production rate of twelve per month. The staff is advised that the economic production rate for the DIVAD gun will not be reached until the last year of production because of insufficient funds.

We have the F-15s, the F-16s, which are not being bought at a cost effective level now.

HANDGUN STANDARDIZATION

One other thing before I pass the witness, this committee, for several years, had studies made which showed the military should have a single handgun.

On May 4, I sent Secretary Weinberger a copy of a Surveys and Investigations study on the procurement of 9 mm handguns. The report showed mismanagement and persistent footdragging by the Army and lack of firm direction from the Office of the Secretary of Defense.

For example, the Army refused to use the results of Air Force tests of 9 mm handguns. One of the reasons cited was that the sand, dust and mud tests were not conducted using military specification sand, dust and mud.

What is the difference between sand, dust and mud and sand, dust and mud matching military specifications?

The Army knew two months beforehand that the tests would not produce an acceptable weapon. Nonetheless, the Army refused to advise OSD of the progress of the testing program.

The joint requirement for a silencer cannot be fulfilled using current technology.

The Air Force users subsequently stated that no silencer requirement existed, while the Army users stated that they had never been consulted.

While none of the guns in the invalidated tests met the specifications, the gun which consistently performed worst was the current .45 caliber.

We have also heard protests from some of the manufacturers that defective ammunition was used in the testing, and that parts

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were interchanged with guns of other manufacturers during the tests.

Mr. Long, all of this points to a disgraceful performance of the Department in this program. It is a discredit to all of the management initiatives which have been so proudly boasted. The situation cries out for firm management and direction from the Office of the Secretary of Defense. Yet, Deputy Secretary Carlucci wrote to me on the 28th of May to say that the Army had again been given the responsibility for developing the acquisition strategy.

The administration's management philosophy of delegating to the services led to serious consequences the first time around.

What is OSD doing to assure that we do not end up with another disaster the second time around?

The Army is fighting. They don't like changes. What are you going to do? Why give it back to them?

This is a gun for all the services.

Mr. LONG. First of all, this is a program that has, for a period of time, gotten a high degree of visibility. I would respectfully take issue with some of the pejorative words in the report that ascribe evil intent to the Army and its personnel.

Mr. ADDABBO. One of the reasons they cited was sand, dust and mud tests were not conducted using military specifications sand, dust and mud. What kind of intent does that show?

Mr. LONG. Well, it may be reflective of a variety of different intents. I don't think that the Army or its people are deliberately sandbagging, to use a play on words, the system. I can't get into the minds of the program managers.

The Army and others in the Department are conscious of the problems with that program and with the test. The highest levels of the Office of the Secretary of Defense and the Army have discussed the matter. The Army is the service best suited to conduct this program and these tests.

From a management standpoint, I think the ongoing activity will be properly handled. I don't think that simply because we may disagree—and criticize properly—the handling of a particular matter, we should take it away and give it to another service.

The Army has competent people. The program, in whatever form, with the new test, will be, in my judgment—and I am confident of this—properly conducted. I don't know the difference between military specification sand and the sand that we might find at Ocean City. I don't know whether that is a reasonable difference or not.

Perhaps Mr. Little can address the specifics of the Army's activities and its planning.

Mr. ADDABBO. Want to try it, Mr. Little?

Mr. LITTLE. I don't have very much to offer, Mr. Chairman.

Mr. ADDABBO. The reason I say the Army deliberately—deliberately—jeopardized or subverted this test was because right after the test the Army came to members, their friends on the Armed Services Committee, and had them put a limitation in the bill, to make sure they don't get the handgun which has been decreed by three different studies. The Army went around DOD, went to the Armed Services Committee, got a member of the Armed Services Committee to put a specific statement in that bill so the Army not

fund a new handgun, because the Army wants to do business as usual.

They want to keep the worst of guns, the 45 caliber. That way they continue to do business as usual. They ignore—ignore—investigations. This is only one of several instances where that has happened.

The Secretary's office has decreed or asked about consolidation of transportation programs. Again circumventing the OSD, the military goes to the Armed Services Committee.

Why? Because Weinberger—the Secretary—has given complete license to the military and OSD has given up its civilian power given it to oversee these military programs, rubber stamping everything the military does.

That is why we see a tremendous increase in these defense budgets, paying more for getting less.

There is a $100 billion increase in 14 months and if we look at the quantity we are getting, we are getting more quantity and less quality because you have given the military full license.

The gentleman from Alabama?

Mr. LONG. May I interrupt?

Mr. ADDABBO. You may answer that.

Mr. LONG. For the record, Dick DeLauer, as you know, is the Under Secretary of Defense for Research and Engineering. Dr. Jim Wade, is his principal deputy. In connection with the ongoing activities of the 9-mm handgun program, Dr. Wade as been designated as the OSD point of contact to work with the Army from a planning and programming standpoint to assure that the Office of the Secretary of Defense is fully informed and advised as this program proceeds.

I don't think that this reflects abdication, as the Chairman's remarks seemed to infer, by the civilian leadership in OSD of its responsibilities. I will suggest to the committee and anybody else who asks, that the Department cannot be run by one person. There is an attempt in this Administration to decentralize management to the extent practicable, consistent with sounder overall programming and planning. To the extent that one looks at that and then looks to activities or events with which one would take issue and reads that as abdication, I just think that to be a misconception.

Thank you for the opportunity to speak. I apologize for the interruption.

Mr. ADDABBO. Mr. Long, you say Dr. DeLauer has taken this program?

Mr. LONG. Dr. DeLauer's principal deputy, Dr. James Wade, is working with the Army.

I don't mean to infer that he is the program manager, but he is, at his level, the point of contact with the Army to assure continuing OSD involvement and to assure a flow of information to the Secretary.

Mr. LITTLE. If I might go on, Mr. Chairman, the present plan is that a draft request for a proposal will be sent to industry. They will comment on it. Whenever we get the comments, what we think they can produce that will be satisfactory, a request for proposal will be sent out. We will expect to get the acquisition under way.

Mr. ADDABBO. Has anyone in (OSD) asked for an independent review of the test that was given to the 9-mm gun? We have made some hard accusations here. We made them before.

Your office has been apprised of them. Has anyone in your office reviewed those accusations?

Mr. LONG. I would have to check into that, Mr. Chairman. I don't know if we requested the National Science Foundation or some independent testing body to examine the tests. I apologize, but I just don't have that information.

[The information follows:]

The Office of the Under Secretary of Defense has informally reviewed the test results of the last 9mm handgun procurement effort. This review revealed that the 9mm handguns performed better than the present .45 caliber. However, since all were below the stated specifications we chose to accept the Army's position that a new competitive procurement be pursued rather than conducting a more formal investigation of the tests.

Mr. ADDABBO. In reading from a letter to myself dated May 28th by Frank Carlucci, he states, "I have asked the Army to provide updated acquisition strategy for this high interest program."

This was on May 28th. I notice you probably don't have the information now, but supply for the record as soon as possible when you expect to get this answer back from the Army.

Mr. LONG. I would be pleased to, Mr. Chairman.

[The information follows:]

On 30 June 1982, the Deputy Secretary of Defense asked the Army, in coordination with the other Services, to develop, and obtain Dr. Wade's approval for an acquisition plan, to include milestones, by 15 August 1982. When this acquisition plan is approved Dr. Wade will provide it for you.

Mr. ADDABBO. The gentleman from Alabama.

Mr. EDWARDS. Thank you, Mr. Chairman.

It would seem you would do something on this thing just to get this committee off your necks. It has been an issue over here for a long time. Nothing ever seems to get done.

If for no other reason, it looks like you would save yourself a lot of grief if you would do something with it; right or wrong.

CONTROLLED DECENTRALIZATION INITIATIVE

You talked about the effort to decentralize somewhat. The Carlucci initiatives referred to controlled decentralization. It sounds good. I guess the question is, does it work?

There are examples the staff has put together of areas where they think perhaps it doesn't work. I would like to go through some of those and then inquire about them.

Lack of firm control and direction from OSD allowed the 9 mm handgun acquisition program to become embroiled in inter-service turf battles and to produce a defective requirements document and an invalid testing program.

You have just spoken to some of that.

The Army and the Marine Corps are preparing to buy as many as four different shoulder-fired antitank and urban warfare weapons.

The Air Force was permitted to buy a one-of-a-kind piece of training range equipment rather than use the Joint Program Office which had developed and procured similar equipment in the past.

The Phase II single manager for conventional ammunition directive was seriously weakened as a result of service opposition to a strong directive supported by OSD and the GAO.

The Marine Corps, is proposing to buy a different and more expensive heavy military truck than the Army, even though many of the missions are the same.

The Army proposed to circumvent an OSD production review of the multibillion dollar DIVAD program.

What studies or analyses led you to conclude that decentralization and delegation were desirable objectives in the DOD acquisition process?

Mr. LONG. Let me go back to the initial part of your question which used the phrase "control and decentralization."

The Components of the Department recognize that the ultimate responsibility rests with the Secretary of Defense. The Military Departments do have authority under the Armed Services Procurement Act to do the acquiring.

That is where the acquisition authority reposes. Yet the ultimate responsibility rests with the Secretary of Defense.

The notion of control, in at least my view, is an important element of the overall decentralization posture. The way to best describe how we are attempting to implement that is through the flow of information to the staff in the Secretary's Office sufficient in quality and quantity, hopefully not excessive in either, to enable the Secretary's staff to determine that a particular program is proceeding generally within its parameters which may include costs, schedule, operating requirements, etc.

To the extent that a program is proceeding within the anticipated parameters, then the Military Department—that is, either the acquirer individually, or the lead in the joint program—continues to manage the program and make the decisions to further the advancement of the process, be it development or production.

When information comes in that indicates that the particular program is outside the parameters, again be they cost, schedule, operating requirements or whatever, it is at that point that the Office of the Secretary becomes more deeply involved.

That is a statement of what in the ideal world controlled decentralization is. Any of us in this room, the staff, the Committee, OSD, the Military Departments, could point to instances in which that sort of philosophy has not actually occurred.

The term "micromanagement" is thrown about. It is kind of a buzz word these days. I guess whether a higher level involvement in a particular matter is micromanagement or not depends upon whether you are the manager or the managee. We have said Congress micromanages. The Military Departments say OSD micromanages. It is a very difficult balance to strike on a program by program basis. We don't do a perfect job.

Yes, there is a school of thought on almost any issue, with respect to almost any program, that we ought to do it the way we are doing it; we shouldn't change. There is legitimate, reasonable debate on almost any issue. One can talk about the first example in your seriatim commentary on programs, the shoulder fired antitank weapon. The Army has a particular requirement, and they have a particular operational mode of deployment. Again I reiterate that I am not a tactician and I will ask my colleagues to correct me if I am wrong, but my understanding is that weight, to the Army, is much more critical in terms of its operational mode than

it is to the Marines. There is a legitimate operational difference between the Army and the Marines and, therefore, there are two different weapons under consideration.

I can't go through the series of programs specifically because I just don't recall them.

Mr. EDWARDS. May I stop you right there?

I am not trying to pass judgment on a shoulder-fired antitank gun. I am no great expert on these kinds of weapons either. It seems to me though that what is lacking is a hard-headed, no nonsense position in OSD that would grab up the competing services and bring them into one room and knock some heads and say all right, now have you really squeezed out all these things to the point that you, in fact, need two different kinds of weapons to kill the same enemy and the same kind of tank in a similar or near similar battle.

Once you get out on the field and are trying to kill a tank, there is not a whole lot of difference whether you are Army, Marine Corps, sitting in Japan, Okinawa, Russia, or China. The tank is still there; the need to kill it is still there.

I think what this committee feels is that there is no real head-knocking going on in the central part of your establishment.

Mr. LONG. I would respectfully disagree, Mr. Edwards. There may not be as much as some of us would like, but I would suspect that the service representatives here would say there has been some head-knocking.

Without regard to specific issues, I think we all recognize that we do need to do a better job of coordinating our activities, of relating to broad mission areas rather than narrow threats.

I don't believe that this Administration or this Congress, in the short-term, is going to make dramatic changes, but I think that through the leadership of the Department of Defense—and I don't mean just the Office of the Secretary, but I mean the Secretaries of the Military Departments, the Joint Chiefs, there is developing a greater degree of cooperation across the board.

One can pick out an anecdote and dispute that, but I don't think anecdotes are reflective of the system, whether it is the system of cooperation among the components of the Department or the way we acquire our weapons systems or any other part of our system.

I think that the system is improving and that there is some head-knocking. In the C^{3}I area there has been some determination that we are going to integrate our operations among the Military Departments much better than we have in the past. Mr. Gordon just reminds me that in some of the missile programs we have done so. I say "we." I am not taking credit for this on behalf of the Secretary. It is an inter-element, cooperative venture within the Department. It is coming about because all of us recognize in OSD, as well as the military departments, the need to do a better job of coordinating our activities, our procurements, our deployments, our operations, and everything else.

I would now like to ask my colleagues if they care to comment on that.

Mr. PYATT. As one of the services, I felt some serious head-knocking from my friends in OSD. I spent time in past life in OSD and participated on the other end. So I guess I don't perceive what you

perceive. I also perceive an environment that allows and encourages debate and discussion on the issues and the process that makes decisions.

I also have been around long enough to know that decisions aren't always perfect and sometimes need to be reopened. That applies from what I have seen in the Defense Department as well as on the Hill.

So I perceive a system designed to bring out the best of our managerial talents that we have spread throughout the whole Defense Department.

Built into it are enough checks and balances and oversight to know.

Mr. EDWARDS. So you are all saying then that within reason controlled decentralization is working?

Mr. LONG. It can be made to work better than it is; it is working better today than it did a year ago. It is not perfect by a long shot. There are improvements to be made, but it is a reasonable approach to what is an overall very difficult management task.

IMPROVEMENTS FROM CONTROLLED DECENTRALIZATION

Mr. EDWARDS. Can you point to some improvements in the system as a result of the controlled decentralization initiative?

Mr. LONG. I think the changes in the Defense Systems Acquisition Review Council process are illustrative. We have a system burdened with paper work, with reports, with reviews, and with briefings. Some estimates of the allocation of the time of a program manager on a major program indicate that as much as 70 percent of his time is spent giving briefings and preparing reports. We think that controlled decentralization, as applied to the weapons system milestone decisions, will ease the burden of our manager at all levels. Yet the Secretary of Defense will be provided with a continuing flow of information sufficient to enable his staff to determine the status of many of the programs.

When we raised the thresholds, the R&D and procurement levels, which served as a cutoff point for what systems would be subject to the DSARC process, a number of programs reverted to the services for determination of the milestone decisions. At the same time we kept the management information flowing to the Secretary. As that has been pushed down by the services to various levels, the number of briefings has been reduced. The time of the program manager, hopefully, is freed up now so that he can manage his program and not spend 70 percent of his time in briefings.

Mr. EDWARDS. Can you point to any personnel reductions as a result of this change in approach?

In OSD I am talking about.

Mr. LONG. I cannot point to any personnel reductions. I will be happy to research that question and provide an answer for the record as to whether there have been any.

Mr. EDWARDS. If you are doing less reviews, for example, you have either freed up some people for other work or you have done away with the need for some people, it would seem like.

Mr. LONG. Or we are doing a better job on what is coming in.

Mr. EDWARDS. Of course. Put something in the record that can give us a handle on that, if you will.

Mr. LONG. I would be pleased to.

[The information follows:]

There are, at the present time, thirty six systems acquisition programs designated as major programs. Each of these programs is reviewed by the Defense Systems Acquisition Review Council (DSARC) two or three times during its development cycle. Typically, a program manager will make five or six briefings at the OSD level in preparation for the DSARC review. In our experience, where the majority of the program manager's briefings have occurred is within the Services where numerous reviews take place up the chain of command and to functional specialists. Thus, the principal reduction in the number of briefings is within the Services when the number of systems reviewed by the Secretary of Defense is reduced. Whether there are thirty six or forty such programs does not impact on the number of personnel in OSD so much as it has an effect on the individual program managers. Therefore, you would not look for personnel reductions in OSD but for greater efficiency at the operating level—in the program manager's office. Reviews of any kind are beneficial in that they raise questions and allow other points of view to be expressed. However, while the demand on each reviewer's time is small (a few hours perhaps), the demand on the briefer's time can easily get out of hand if a large number of reviews are demanded of him. It is that inefficeincy we are trying to reduce.

TRANSPORTING EQUIPMENT TO THE BATTLEFIELD

Mr. EDWARDS. We recently—everybody is holding hearings on airlift capability. If you have nothing else to do, you hold a hearing on whether you want the C-5 or the 747 or the C-17 or none of the above, or all of the above or the KC-10 or whatever.

In all of this, we have come across information that there are some 150 individual pieces of Army equipment including combat support and combat service support equipment that can only be airlifted in the C-5 aircraft.

I would certainly assume that all that equipment was not built in the last year and a half and that it is equipment that we have built over the years.

The question, however, is, assuming there has not been a clear policy in OSD on this subject in the past, is there one now or can I assume there was no clear policy in the past to build tanks, trucks, helicopters, whatever we are going to send into the field of battle of a size that will, in fact, fit into those conveyances which we expect to use to go to battle?

I think that is a fair question.

Has there been any new policy on that?

Mr. LONG. I think the policy is by and large reflective of the need to move equipment. That is not to say that every piece of equipment that we buy or have built will or can be sized in a manner that will be consistent with airlift. There are other modes of transportation. There are other ways to have equipment where it is most likely to be needed, prepositioning and the like. Nor is there in existence an aircraft that will serve every possible need for every component. It is a matter of striking a balance.

Mr. EDWARDS. Let me back up then.

When you start designing a tank, is there an early point where you say, OK, where will this tank serve? How will we get it there? What will it fit into, and so forth?

Mr. LONG. In the earliest stages of the planning process, the Mission Element Needs Statement provides for the analysis that goes

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in at the earliest stages to cover all of the above. However, in terms of most likely or expected areas of deployment, things change, world events change, the most likely area of deployment in 1980 would be different than 1970. There is a lot of very thoughtful analysis at the earliest levels of the concept definition stage.

Mr. EDWARDS. Let me see if I can put it another way. I am not sure I am hearing the answers I ought to be hearing. Maybe I am not asking the question right.

We have 77 C-5's; is that about right?

Mr. GORDON. Yes.

Mr. EDWARDS. If I understand it correctly, the M-1 tank will only go in the C-5. It won't go in any other plane.

Mr. GORDON. That is right.

Mr. EDWARDS. We have at least one helicopter we have been hearing about—more I think, but I can't put my finger on it—that the Army has said will have to be pretty much dismantled to get in anything but a C-5; that would take too long at the end of the line to put the helicopter back together again in time of battle.

All of these you are going to send over by air would have to go in the 77 C-5's. I am sure those who have followed this issue are more intimately familiar with this, and have other examples of weapons systems that can only go in the C-5.

That suggests to me that somewhere back down through the years we have not been properly planning the design and construction of these systems. Either the conveyors, the transporters, or the system to be transported.

Without trying to get you to pass judgment on what has been done over the last 10, 15, or 20 years, or through history, what I really would like to know is, are we paying more attention to that thing now?

Mr. DICKS. Will the gentleman yield, just so I can embellish this slightly?

Mr. EDWARDS. Of course.

I was delighted to see you come in when you did.

Mr. DICKS. Of the outsized equipment we have today, only 22 percent has actual combat capability.

Seventy eight percent are trucks, vans, cement mixers, all the other equipment. Why was that designed as outsize when it should have been designed to fit into all of our aircraft? Why do we have to have great big vans that can only go in the C-5?

You could have designed the rest of the outsized capability, outsized equipment, in such a way that it could have gone into existing aircraft. Was that even taken into consideration?

Mr. LONG. Yes, we have some outsized vans. I assume your information is correct; but not all our vans are outsized. I can't tell you the operational analysis that led to an outsized van or a smaller van.

What I can tell you is that the need analysis, at whatever time, takes into account operational requirements, transportation requirements, and other requirements. Any of us could look at an operational analysis and disagree with a conclusion or a weighting because there is a lot of judgment involved.

It is fair to say that transportability is an important element in the operational analysis at the early stages. I will not tell you that

it is the most important element or the least important. The importance of the various elements of analysis in any system or item of equipment will vary from item to item, but I don't think it is accurate to say or imply that transportation and transportability is a factor that is ignored.

It is, in actual practice, a factor that is very much considered. Why we have an outsized van rather than all smaller vans that will fit in some of the other transport equipment, I can't tell you. I can go back and read the analysis provided, and then provide it for the record, but transportation is a factor considered.

[The information follows:]

Department of Defense Directive Number 3224.1, dated 29 November 1977, subject "Engineering for Transportability," provides policy guidance and assigns responsibilities for assuring that items of materiel, equipment, and transportation systems are so designed, engineered, modified, and constructed that the required quantities can be efficiently moved by available means of transportation.

"Engineering for Transportability" is the performance of those functions required in identifying and measuring the limiting criteria and characteristics of transportation systems; and the integration of these data into the design of materiel to utilize operational and planned transportation effectively.

The Directive specifies that transportability shall be a major consideration in:

a. Formulating the priority of characteristics in the design of any new or modified item of materiel, or adoption of a commercial nondevelopment item.

b. Modifying existing transportation systems, and

c. Developing integrated logistic support for systems and equipment in accordance with DoD Directive 4100.35.

The Directive is broadly applicable to materiel to be moved by towing, by self-propulsion, or by carrier via railways, highways, waterways, pipelines, oceans, and airways. Joint Army, Navy, Air Force, and Marine Corps regulations were issued implementing the Directive for uniform use by all DoD components.

Mr. LONG. Are we paying more attention to it? I can only say we are paying a lot of attention to it. I don't know how much attention was paid in 1970 and 1980. I can tell you—and again I think my colleagues from the services can tell you—that this is a factor that is considered with regularity at the earliest stages and throughout the planning process.

General Connolly?

General CONNOLLY. Yes. I would say we do consider it in the analysis process the requirements.

Mr. EDWARDS. Yet we find ourselves being asked to provide an additional fifty C-5Bs. The plan really calls for 112, as I recall, or 113 C-17s or something. I can't remember all the numbers. A lot more than the 50 that you are talking about now on top of the 77 that you got.

That suggests to me that somewhere back down the road somebody didn't plan all these things right.

Either that or strategy and doctrine has changed as to how you get all of this to the battle front. Maybe that has something to do with it. Maybe that is all tied in with RDF, which is no longer RDF, but the new Near East Command, or whatever it is.

Well, I won't belabor it. I just think we need to feel comfortable in the fact that that is a vital element in the design and preparation of these systems.

Accountability is a key element —maybe I better yield the floor. I have had the floor too long.

Mr. MURTHA [presiding]. Go right ahead.

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ACCOUNTABILITY OF PROGRAM MANAGERS

Mr. EDWARDS. Accountability is a key element in the sound management of any organization. If mistakes are made, senior management should be able to take appropriate action regarding the individuals or entity at fault.

Secretary Carlucci's memorandum on improving the acquisition process includes the following quote: "Through controlled decentralization, subordinate line executives will be held accountable for the execution of policy decisions and programs as approved."

What level of management is meant by the term "subordinate line executives?"

Mr. LONG. That includes levels down to and including the program manager. The services are structured differently in their various elements of line management from the program manager up through the acquisition command to the Chief and to the service secretary. We are really talking about the line managers at all these levels.

Is that consistent with your understanding of it?

General CONNOLLY. Yes, right.

The program manager is accountable.

Mr. EDWARDS. Are there examples of action taken against subordinate line executives who have mismanaged programs? I am not looking for names necessarily.

Mr. LONG. There have been changes in management. I don't have an example to give you here today of a specific circumstance in which a line manager was changed because of the events of a particular program, but I will be happy to look into it and supply that for the record.

[CLERK'S NOTE.—The information was not received in time to be printed in this hearing volume.]

Mr. MURTHA. Let me give you two examples I found out just by going out into the field.

I wish you would check and see if anybody changed places after that. I went out to visit a rewinging job in the Midwest. When I talked with the foreman, he said, "Why don't they put skin on the wings at the same time they put engines on instead of putting new engines on and bringing the plane back later to reskin them?"

We found out they could have saved about $50 million by doing that.

I don't know how much money was spent before the Air Force decided to make the change. It seemed like the program manager, certainly somebody, was in error in doing these separately.

In other words, putting new engines on and then having to take the engines off to reskin them. That is one example.

The second example is the utilities that shrink. Out in the field I talked to the soldiers. They said the camouflaged utilities shrink two or three inches every time they are washed. I brought this to the Secretary of Defense's attention at the hearing when he appeared before the committee. I haven't heard any more about it.

Those are two examples in my estimation of poor procurement practices which I would like to know what happened to the manager if this has been corrected in both instances.

Mr. LONG. I will be happy to research both of those, Mr. Chairman.

I will suggest, however, with respect to your first example, that we have new ideas all the time.

Mr. MURTHA. Mr. Secretary, this is not a new idea.

Mr. LONG. I don't know the background of it.

Mr. MURTHA. This was a simple procedure where they were reengining the airplanes, taking the airplane out, bringing them back to reskin which meant they had to take the engine off and put the engine back on again.

The Air Force admits it was in error. It first felt it would save $108 million; now the second letter I received says they will save about $50 million.

What I am saying is, it seems to me the program manager was certainly in error.

A layman to go out there and discover something as simple as that by talking to a foreman seems like a substantial error.

I would think the program manager ought to be held accountable for something like that.

Mr. LONG. I will look into it.

General CONNOLLY. To be fair to the program managers, I would like to introduce a comment. Our program managers don't have complete authority over funding, budgeting, and major program decisions, and force structure.

A lot of these decisions are sort of above the program manager in the overall management of the Air Force. I don't want to——

Mr. MURTHA. General, I am not arguing that any particular program manager was responsible for this. Somebody at some level is responsible for an error like that. I don't know if it would have saved any money. They were in the very early stages of this rewinging and reengining job.

The point is, somebody was responsible for that decision. They should be reviewed at some level and those errors corrected.

[The information follows:]

CHANGES IN LINE MANAGER

The two modifications to the C-135 must be put into time perspective. The Boeing Military Airplane Company in Wichita, Kansas has been reskinning the wings of all

series of the C-135 since 1974. For the past several years this has been at a rate of 72 aircraft per year. They are on a contract, with options, to complete the fleet of more than 700 aircraft in fiscal year 1988.

The second modification is reengining of some or all of the KC-135 portion of the fleet (up to 640 aircraft) with the CFM-56 engines. The first aircraft was delivered by Boeing in June 1982. This aircraft was reskinned and reengined concurrently. It will be used as the flight certification aircraft. First production installation will not occur until April 1984. Production will build up to a rate of 72 per year, but this will not occur until fiscal year 1987 as we near the end of the reskin program.

As can be seen, the window of opportunity for concurrent installation is rather narrow (172 aircraft) because of the different time frames for the two modifications.

Our budget for the CFM-56 reengining program is based upon a concurrent program for the 172 aircraft. However, the Air Force does plan to compete the installation of the reengining modification. If competition results in a contractor other than Boeing installing the engine kits nonconcurrently, the competition will ensure that total program costs are less than Boeing's bid for concurrent installation.

CAMOUFLAGED UTILITIES

The Army began fielding the battle dress uniform (BDU) in October 1981. In November 1981, sporadic reports from field units indicated BDUs provided to soldiers were undergoing excessive shrinkage. A task force was immediately formed to investigate these reports and determine their validity. Shrinkage tests were conducted and results indicated that the average shrinkage experienced in laundering the BDU was not excessive. This tests determined that BDUs shrank 2-3 percent (less than 1 inch).

Even though the Army instituted a very liberal exchange policy, less than 0.2 percent of uniforms issued to date have been returned because of excessive shrinkage. This fact further substantiates the test results. The task force found that a major factor in the shrinkage problem was the temperatures used in laundering and drying of the uniform. The Army has subsequently issued definitive uniform care instructions to both individual soldiers and government laundries. Since this effort, only a few complaints have been received. In the final analysis, the problem of shrinkage is manageable, a fact which seems to be supported by the overwhelmingly favorable reception this uniform has received from the soldier.

Mr. EDWARDS. Please answer the following questions for the record.

[CLERK'S NOTE.—Questions submitted by Mr. Edwards and the answers thereto follow:]

EVALUATING "SUBORDINATE LINE EXECUTIVES" AND PROGRAM MANAGERS

Question. On the one hand, the enormous size of the DOD and its bureaucracy, necessitates a level of decentralization for its management. On the other hand, that enormous size probably assures that a lot of "feifdoms" and individuals program managers can perpetuate themselves, despite mediocre performances, in a decentralized management structure.

What criteria are used in evaluating "subordiante line executive" and programs managers?

Army answer. "Subordinate line executives" and Program Managers who are Department of the Army Civilians are evaluated by means of a Performance Appraisal which is the periodic evaluation of a merit pay employee's performance of duties and responsibilities as measured by the performance standards for the position. A performance standard is a description of the level of accomplishment necessary for fully successful performance. Performance standards are expressed in terms of objectives, specific actions, project assignments, and other qualitative and quantitative requirements related to major job elements. At the beginning of the

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rating period, each supervisor, in consultation with the merit pay employee, will—

a. Identify major job elements.

b. Determine which of these elements are critical elements.

c. Delineate supporting tasks needed to accomplish the job elements, and

d. Establish performance standards for each major element.

"Subordinate line executives" and Program Managers who are Army Officers are evaluated by an Officer Evaluation Report in accordance with Army Regulation 623-105, 15 November 1981. Performance is evaluated by considering the results achieved, how they were achieved, and how well the officer complies with professional values.

The following criteria are used for evaluating both Department of the Army Civilians and Military Officers serving as Program Managers and subordinate line executives.

1. Resource Management.
2. Management Techniques and innovations.
3. Project complexity.
4. Personal qualities (e.g., leadership and ingenuity).

Navy answer. The Navy Material Command does not have specific criteria outlined in evaluating "subordinate line executives" and program managers. The personnel filling these positions are both military and civilian. All receive annual evaluation but are under different system:

a. The military system has a "report on the fitness of officers" which includes detailed evaluation of specific aspects of performances and personal traits. The evaluation is made by the officer's supervisor and approved by the first flag officer in the chain of command. The fitness reports are used in the Naval Military Personnel Command promotion selections and assignments.

b. The civilian system is the merit pay system which evaluates the achievement of performance objectives established annually. The evaluation is made by the member's supervisor and finally approved by the Command's merit pay reviewing officer. The final rating is used to calculate the member's pay raise.

Air Force answer. The decentralized management process does not negate the normal "Chain of Command" management process. Each individual is evaluated by higher level management officials. Officers receive annual Officer Effectiveness Reports (OER). Civilian Managers receive General Manager Appraisal System evaluations annually. Each of these rating systems provide for at least two levels of management review above the rater level.

In addition, the Organization Commander has periodic meetings with higher level Commanders. During these meetings performance of key personnel is evaluated.

The combination of these processes assures that mediocre managers and "subordinate line executives" do not perpetuate themselves.

Question. Military personnel undergo an annual Officer Evaluation Report. Is a somewhat comparable evaluation made annually of "subordinate line executives" and program managers?

Army Answer. If Program Managers or "subordinate line executives" are military they receive an Officer Evaluation Report.

If the Program Manager or the "subordinate line executive" is a Department of the Army Civilian he will receive a Performance Appraisal at least annually in accordance with Army Regulation 690-500, Civilian Personnel, Position Classification, Pay, and Allowances, 1 December 1980.

Navy Answer. The annual officer evaluation report, i.e., "report on the fitness of officers", is the evaluation vehicle for military "subordinate line executives" and program managers. For those that are civilian, the vehicle is the merit pay system evaluations described in the response to the previous question. It is comparable in that it is accomplished annually and has some real meaning, i.e., determination of pay.

Air Force Answer. Yes, the Air Force utilizes the General Manager Appraisal System (GMAS) to evaluate program managers in all of its occupational skills. It is a system established as a result of the Civil Service Reform Act (CSRA) of 1978. The system provides for establishment of performance standards based on identification of the critical and noncritical job performance elements. The critical and noncritical job performance elements in this case are directly related to the acquisition program. GMAS provides for a basic pay differential (Merit Pay) based on the quality of the employee's performance as a manager. Air Force GM employees are evaluated annually under the General Manager Appraisal System (as of 30 Jun).

DSARC PROGRAMS DELEGATED BACK TO SERVICES

Question. Your statement says that 10 of the programs have been delegated back to the services.

Which programs are these?

Answer. The programs that have been delegated to the Services are:

LVTX—Landing Vehicle Tracked Experimental (Marine Corps amphibious surface assault)

PLSS—Precision Location Strike System (Air Force locator of radars and jammers)

CNCE—Communications Nodal Control Element (subsystem in TRI-TAC joint tactical communications system)

IMAAWS—Infantry Manportable Anti-Armor Weapon System (Army DRAGON missile replacement)

FLMC—Force Level and Maneuver Control (Army Tactical Command and Control)

AIM-7M—Sparrow missile with new monopulse seeker (Navy and Air Force)

SURTASS—Surveillance Towed Array Sensor (Navy acoustic sensor)

LCAC—Landing Craft, Air Cushion (Navy amphibious assault)

IWD Mine—Intermediate Water Depth Mine (Navy)

VCX—Logistics aircraft carrier on-board delivery replacement (Navy)

Question. Was program cost the only factor in this decision, or were other factors like prior performance, cost growth, stability, etc. taken into account?

Answer. Cost was not the only factor taken into account in the delegation decision. Other factors considered were the stability of a program which was close to the threshold on cost, lack of substantive issues which would require special management attention, favorable test results which indicated the program to be on track, or the expectation that additional technology base effort would be required before the program could proceed as a system acquisition.

[CLERK'S NOTE.—End of questions submitted by Mr. Edwards.]

IMPROVEMENTS IN DEFENSE INDUSTRIAL BASE

Mr. EDWARDS. The Carlucci initiatives, as have many other studies, addressed the question of the defense industrial base. That is something we are all concerned about.

Congress doesn't have locks on its concern for the issue. The Defense Department is obviously concerned about it; should be, and is.

Can you address the question of improvements that have been made in the industrial base as a result of the Carlucci initiatives or as a result of the work that has been done by the Administration in the Pentagon in the last year and a half?

Mr. LONG. Mr. Chairman, this is going to be a sort of multifaceted answer, because I think there are lots of activities going on in the industrial base.

We are concerned from a current production standpoint as well as a surge capacity standpoint about the ability of the private sector on which we rely to supply the goods and services we need. In some respects I think we, the government, and perhaps we specifically, the Department of Defense, have not been very good buyers. One of the things that we are really focusing on is to be better buyers. We harp all the time on competition among sellers, but the capacity to produce is owned by private enterprise. We have to compete as buyers, to get the owners of the production equipment to dedicate their resources to our needs.

In that connection, we are concerned about the profitability of private enterprise. Without a profitable industrial base, we are not going to have an industrial base. Without an industrial base, we will not have a well founded Defense supply base.

The specific elements of what I will call the overall program include a variety of actions to develop specific incentives that will incentivize industry to invest. One of the problems that we see in connection with the Defense industrial base, in contrast to the overall industrial base, is illustrated by any of us going into almost any facility that has combined civilian commercial production and defense production. By and large, you will see the robotics, the new investment in the commercial side of the house. You see the 20-year-old presses, and so forth, in the Defense side of the house. Why is that?

One of the reasons goes back to the linchpin of the DOD Acquisition Improvement Program, instability, or its converse, the desire to improve stability.

Instability inhibits investment. There is a lack of certainty in the ability to recover the investment, much less generate a return on that investment. Much of what we are involved in relates to the

need for an approach that will stimulate and foster private sector investment in the plant and equipment needed to produce the goods and services we need.

To facilitate planning on the part of the private sector of our economy, we have developed—and I don't take credit for this, Carlucci doesn't take credit for it, because it started earlier than that—a Defense Economic Impact Modeling System, the so-called DEIMS. It takes the five-year defense plan and overlays it on the economic model developed by a company in Boston enabling any of us to look into the future years and see what impact Defense planning is going to have on various sectors of the economy, down to the four digit standard industrial codes. That is another action we are publicizing a great deal because it does facilitate long range planning. That is one of the things our Defense industry hasn't been able to do.

The DEIMS also looks to the future in terms of 73 or so skilled labor categories and projects out the needs so that, working with the Department of Labor, we can take steps to, at least, improve the likelihood that industry will have the skilled labor it needs when it needs it. We can't solve that problem alone. We can't solve the industrial base problem alone because we are really, in many industries, a very small player.

In the steel industry, for example, we are consuming something like four percent of the steel. So we do have a limited ability in going it alone to make a big difference, but we are trying, to the greatest extent that we can, to come up with, on a Defense industry basis, the programs that will stimulate investment.

For example we have a MANTEC program, Manufacturing Technology, in which we, the government, will fund with a contractor investment in a particular piece of equipment, new equipment, or improved equipment.

One of the conditions for our investment is that once the manufacturing technology or process is completed, brought to fruition, it be shared with not just the Defense industry, but industry generally.

We have technology modernization programs. One of the difficulties that we have faced in terms of Defense industry investment goes back to the way we do business. We are in many instances, as you know, a cost-based pricer as opposed to a market pricer. Because in many of the things we buy, we are the market. So there is no place else to turn to find a market price. We are also an annual buyer, set multiyear aside for now. When you combine those two factors, you have a built-in disincentive to the defense industry to invest.

If I am supplying the Department of Defense under a contract today, I may well find an investment in some equipment that may reduce my costs for the rest of this fixed price contract for this year; but next year my costs will be lower because of this investment. So my profit is going to be lower next year. So we just have disincentives throughout the system.

We are working with the services to come up with programs that take into account this disincentive and try to reverse it. For example, in either the MANTEC program or the TEC MOD—I forget which—one of our large suppliers and the Air Force have just con-

cluded an agreement with respect to a producibility enhancing investment for an annual buy that is expected to be followed by successive annual buys in which the cost savings over the out year contracts will be shared. It is the only way the substantial investment can be made to pay off the supplier.

We are coming up with what we think—and the we, I hasten to add, is not just OSD, but the people running these programs in the military departments as well—new ideas to try to stimulate investment.

When we talk about the ailing industrial base, what we are really saying is there hasn't been investment. That is what we are trying to foster.

CAS 409 is a problem. That is the depreciation standard in the Cost Accounting Standards. We would like to do something with CAS. I don't know what it is. CAS 409 is the Standard that governs the amortization and depreciation of equipment over time. As you know, the Economic Recovery Tax Act had a new tax depreciation schedule that allowed for tax purposes new plant and equipment to be written off over shorter periods of time than previously.

I don't know what is appropriate for the Department of Defense from a pricing and cost allowability standpoint, but we would like to have the flexibility to enable our contractors to write new plants off over something less than 45 years or some extended period of time, again as an incentive. We can't deal with CAS, however, because when the Cost Accounting Standards Board was abolished by the Congress several years ago, no other body was given the authority to deal with the standards. Standards were kept in place, but only the Congress itself can amend a standard or even waive it. That is something that we are talking to the Congress about in a number of fronts; not on CAS 409 specifically but trying to get a CAS authority reposed somewhere, OMB, OFPP, somewhere, so we can deal with the problem.

That is kind of a pitch on my part, asking you folks to please be aware of it. It is something we would like to have the flexibility to deal with because we think it fits into the incentive package.

Mr. EDWARDS. I am going to put some questions in the record. Please, if you feel the need to respond further, I would appreciate it.

[CLERK'S NOTE.—Questions submitted by Mr. Edwards and the answers thereto follow:]

Question. Do you have any estimate as to the time it would take before some result could be expected from these improvements?

Answer. Although the "Carlucci Initiatives" will benefit the defense related industrial base, the proposed buildup in defense spending is fully consistent with the existing capacity of prime contractors and their ability to expand capacity over the next few years. Many of the initiatives are keyed to achieving a more economical and efficient production environment. In some instances the benefits are already being realized. Other more complex improvement efforts will take longer to achieve. Clearly, it will be a gradual process and involve a combination of actions before optimum results are realized.

Question. According to an article carried in several newspapers last Friday (June 11, 1982), the improvements either are not work-

ing, or have not had time to be effective. The articles indicated that business plans to invest 2.4 percent less in 1982 in new plants and equipment and other modernization areas. In addition, another newspaper article carried in the New York Times on Friday, indicates United States Steel Corporation plans to sell $500–$750 million of inventory and other assets to reduce its debt burden. From these articles, it appears industry is going in the opposite direction. How can industry accommodate these increased defense expenditures in light of the current downward trend in industrial plant investment?

Answer. This overall business trend is somewhat misleading in its applicability to capital investment for defense industries. In most instances investment is made at the time of procurement as capital cost recovery is a part of the overhead allowance on defense contracts. The defense sector is relatively small and specialized and for the most part fully capitalized.

Question. Wouldn't it appear that defense equipment delivery delays will increase thereby pushing up costs due to increased inflationary pressures?

Answer. While the possibility exists for equipment delivery delays, we are not anticipating any serious problems. Generally, there is excess capacity at this time and in many areas where past shortages have been experienced such as metals, expansion has taken place.

Question. What is the Defense Department doing, or what can be done, to turn this investment trend around?

Answer. The Department of Defense is implementing a number of initiatives under the DoD Acquisition Improvement Program to treat problems that in the past tended to discourage industry from making necessary capital investments and engage in defense procurement. For example, the DoD has strongly supported legislation to permit more rapid depreciation scheduled for acquisition of plant and equipment—the so called 10–5–3 concept. We have developed a Defense Economic Modeling System which allows us to provide planning information on defense requirements to private sector firms. The purpose is to alert companies to sales opportunities as well as to encourage companies to add additional capacity where needed. The model gives some preciseness as to where the Defense dollar will go in the private economy by fiscal year by sector.

Question. According to one source, in order to revitalize the defense industrial base, the smaller contractors and parts suppliers share must be expanded and revitalized, skilled labor shortages must be eliminated, production equipment must be modernized, and stabilized sources of unique materials must be established. Has the Department of Defense implemented any improvements that address these specific problem areas?

Answer. No one can guarantee that shortages of specific materials, components, or categories of labor will not occur. However, shortages and long leadtimes experienced on some items in 1979-80 have abated. For key items (e.g., titanium sponge, heat treated aluminum plate) capacity has been added. We have no evidence now of serious bottlenecks in materials or components. Only in as very few categories of skilled labor do we anticipate difficulties. More-

over, DoD has taken initiatives to limit the possibility of bottlenecks and to deal with any specific bottlenecks that arise. Our Acquisition Improvement Program is structured to treat many of the problems that in the past contributed to capacity shortfalls and long leadtimes. We have also created a means for providing industry with 5-year projections of total and defense related demands for a large number of products and categories of labor. With this advance planning information on defense procurement, industry can better prepare itself to compete for defense business and pursue the necessary capital investment

Question. What is industry doing to improve these shortcomings?

Answer. Industry activity is varied. However, we remain optimistic that DoD initiatives to improve the acquisition process will provide necessary incentives for industry, particularly the subtier base, to become involved in Defense related procurement. There are specific instances, such as at Westinghouse, where new technical investments are being made in order to better compete for domestic as well as world market opportunities. It is clear that industry understands that new investment must be pursued and that the Department of Defense is attempting to make appropriate policy changes to accommodate this objective.

Question. Apparently, industry doen't feel plant investment is critical in light of their plans to spend less on plant equipment in 1982. What is industry's attitude on this subject, and how do they plan to turn around these shortcomings industry-wide?

Answer. There are a number of factors which contribute to the industry trend to spend less on plant equipment in 1982. The overall economic condition which exists as well as the availability of excess capacity largely contribute to this trend. Under these conditions industry cannot be expected to invest in additional capacity. However, we believe industry recognizes the need to improve productivity and efficiency in order to remain competitive. We are optimistic that industry will benefit from policy changes and tax legislation encouraging these types of investments.

Question. If industry can't produce defense equipment in a timely fashion, doesn't it seem a little useless to increase defense spending before these shortcomings are addressed?

Answer. We have no evidence now of serious bottlenecks in materials or components. Only in a very few categories of skilled labor do we anticipate difficulties. We believe that planned defense procurements can be met in a timely fashion by industry and that defense is fully consistent with existing capacity of prime contractors and their ability to expand capacity over the next few years.

Question. According to our Investigative Staff study on procurement practices, many current practices adversely impact the industrial base. The study indicates that the foreign military sales program is competing with commercial sales of the same item. To the detriment of U.S. business, foreign governments are purchasing commercial items through the foreign military sales program at lower costs. Some actions of the Small Business Administration are reducing competition, increasing costs, and lengthening procurement leadtime, resulting in costly production delays. SBA has also issued certificates of competency to small firms with records of

poor or nonperformance. What has the Administration done to correct these problems with industry?

Answer. The Investigative Staff study observes that commercially available equipment is sold through Foreign Military Sales (FMS) arrangements thereby reducing overall profit to U.S. manufacturers. While our basic policy is to have foreign countries buy commercial equipment direct, they are not restricted from pursuing FMS arrangement with clear justification and approval of the Defense Security Assistance Agency (DSAA). In the case cited in the study, the U.S. Air Force processed the purchase of a commercially available helicopter through FMS at the request of the President of Venezuela and by direction and approval of the State Department and DSAA. We do not agree that the helicopter sale to Venezuela was based on the likelihood of obtaining the item about 10 percent cheapter than the normal commercial price. The sale was based on commercial catalog price with an additive cost of 3 percent for USAF administrative surcharge. In our opinion, no disadvantage to the commercial contractor occurred.

The study suggests that implementation of the Small Business Act provisions reduces competition, increases costs, and lengthens procurement lead time. There are some aspects of the legislative requirements that are administratively costly and burdensome. Of particular concern are the provisions of Section 8(a) for awards to the Small Business Administration, the preparation of subcontract plans in large contracts, and the certificate of competency process. While we strongly support contracting with small business firms as being in the national interest, we believe procedures could be streamlined. For example, we have under active consideration a revision to our regulation that would provide for annual subcontracting plans in lieu of contract-by-contract plans, as major contractors are now required to prepare.

[CLERK'S NOTE.—End of questions submitted by Mr. Edwards.]

Mr. LONG. There is another thing. We have substantially greater attention paid in the overall Defense guidance to the question of preparedness, which includes peacetime stability, and so forth. One key guide the Secretary gave to the Department is specifically along these lines: Pay attention, Mr. Service Secretary, and your people, to the ability of the industry you rely on to surge, to produce your peacetime requirements, and to be able to build up to a 90-day sustaining rate one year after you ask them to. That sort of overall guidance is now pervading the Department. It is fostering an increased level of awareness on production, productivity, and the industrial base.

I think the Department is doing the right thing, not just from the Department of Defense's standpoint, but overall for the good of the Nation as a whole.

If we can increase our own productivity in our Defense industry, those processes are going to spread throughout the private sector and improve everything.

Mr. EDWARDS. Let me make just one comment.

I think one of the keys to your whole answer to this question was in the very beginning when you made the point that you recognized the fact that the Defense Department has not been a good buyer.

That goes to the heart of what all of these hearings are about on the subject of procurement practices. It has been our view that because of the tremendous size of the Pentagon, because of the tremendous procurement problems and accounts you have to deal with, that it has been very difficult to be a good buyer, in many ways.

It is the key, I think, to getting the industrial base back on track. Many industries have just simply said to heck with you, a pox on all your houses. We will go off and find our profits somewhere else. It is just not worth doing business with the Government.

If you can take the philosophy into this future upgrading of industrial development, that in fact the Defense Department is going to be a good buyer, going to use good practices, and going about the procurement, then I think you will see people drifting back into the industrial base where we desperately need them.

Thank you for your answers.

Mr. LONG. I would like to clarify a point. When I say we have not been a good buyer, I am not criticizing the system. What I am saying is, we haven't effectively competed for the dedication of effective resources to our business.

Mr. EDWARDS. I accept the fact that you amended that comment, although I think you haven't been a good buyer.

Mr. LONG. In that sense, I agree with you.

Mr. MURTHA. Mr. Secretary, let me give you one other example of a procurement problem before I yield to Mr. Dicks.

PAINTING OF HAWK MISSILE COMPONENTS

The S&I staff of this committee, says that the Army sends Hawk missile components to the contractor for rework. Those components are painted and camouflaged. The contractor repaints them in solid colors. When they get back to the Army, the Army repaints them in camouflage. There is another example I wish you would check into.

[The information follows:]

During 1979-1981, the situation did exist whereby IHAWK equipment returned to tactical units in Europe from a certain repair facility was not camouflage painted. IHAWK units in the 32D Army Air Defense Command have their equipment serviced by two Depot level facilities. The Letter-kenney Army Depot (LAD) in Pennsylvania overhauls major end items of equipment. The HAWK Project Field Facility (HAPFF) in Europe inspects selected pieces of equipment/components and repairs only as necessary. IHAWK equipment returned to field units from LAD is always camouflage painted. The problem was at the HAPFF. The HAPFF is Army owned and operated by Raytheon personnel (prime contractor). At the HAPFF, modifications are applied to major end items of equipment not requiring overhaul. The Army's contract only permitted Raytheon to spot paint if necessary. Due to the equipment's weathered condition, many items were painted in solid colors. In these instances, tactical units had to repaint returned equipment. The Army recognized this inefficient practice and has taken corrective action. The next time major end items will come through the HAPFF will be in fiscal year 83 during the fielding of the Phase II series of product improvements. The revised Raytheon contract will require camouflage painting prior to return of equipment to units.

MULTIYEAR PROCUREMENT PROGRAMS

Mr. MURTHA. The gentleman from Washington, Mr. Dicks.

Mr. DICKS. We have heard a great deal about the so-called Carlucci initiatives, though I read certain articles in the press recent-

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ly, that raised some question about the intensity of the effort within the Administration.

One area that I am concerned about is just exactly what you are doing in multiyear procurement. Is that going forward and can you tell us a little bit about what you are doing in that area?

Mr. LONG. You are familiar, I am sure, with the three or four programs in 1982. We have in the 1983 budget some additional programs. I will be happy to put the number and the specific programs into the record.

[The information follows:]

Fiscal Year 1982 Multiyear Procurements: F-16 Aircraft; C-2A Aircraft; AN-TRC-170 Radio; Blackhawk Helicopter (Airframe).

Fiscal Year 1983 Multiyear Candidates: Multiple Launch Rocket System; SM-1 Missile; EA-6B Aircraft; A-6E Aircraft; NATO Seasparrow; Modular Universal Laser Equipment; T-AO Fleet Oiler; MK-46 Torpedo; CH-53E Helicopter; Defense Meteorological Satellite Program; AN/ALQ-136 Radar Jammer; NAVSTAR Global Positioning System; Blackhawk Helicopter T-700 Engines.

Mr. LONG. In the initial stages of planning and programming for the 1984 budget a number of additional programs are being considered. We tend to highlight in multiyear the larger programs, but there are a host of other multiyear programs that are at levels that don't surface in the budget because they are just not big enough. They are included in some of the other accounts. I think that by and large the support for multiyear is very strong throughout all of the Department of Defense.

One has to recognize that you cannot multiyear everything. You can only multiyear some number of programs. Not all programs lend themselves to the kind of production efficiencies that will make multiyear pay off.

CRITERIA FOR MEASURING CONTRACTOR PERFORMANCE

Mr. DICKS. Let's go on to one other area of questioning eliminating poor contractor performance. One of the Carlucci initiatives was to improve the source selection process by eliminating poor performers, by weeding out attempted buy-ins, and by measuring contractor performance for use in future source evaluations.

What are the criteria by which performance is judged?

Mr. LONG. The criteria would be best stated by reference to the quality of the performance in connection with the principal objectives of the program. There are some programs that have as their principal objective meeting schedule; some meeting operational requirements; and some cost.

Mr. DICKS. Is adherence to cost goals one of these objectives?

Mr. LONG. Yes.

Mr. DICKS. If you had a contractor who said he was going to produce an airplane for $28 million and then wound up, around $80 million per airplane and if that same contractor had a cost overrun of $2 billion and you had to forgive the contractor for all the deficiencies in the airplanes that had been produced as a way to bail out that contractor, and then you had to spend $1.6 billion of the taxpayers' money to rewing a plane that the contractor had made and you also had, to rewing 300 or 495 of another aircraft that the contractor had made, would you then turn around and give him sole source, 50 additional planes to build for the Department of De-

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fense and try to tell us that you are judging him on the basis of anything?

Can you justify that? Have the Carlucci initiatives meant anything more than some kind of public relations activity on the part of the Administration?

You had another competition in which somebody won on the C-17 and it met all elements of the Mission Element Needs Statements that the Air Force and the Army had put together. The Air Force came in and unanimously recommended to the Administration to build the C-17 and then all of a sudden, out of the blue, you come forward and approve a program to buy 50 planes from someone who had the kind of record on procurement that this contractor has and you are going to say to the rest of the industry, we are being fair?

We are being equitable? We are using good contractor evaluation standards?

We are doing this on the basis of past history?

I guess if I were a contractor, I would say if we can make that many mistakes, if we can have a two billion dollar overrun, if we have to rewing our planes, and if we can deliver it to the Air Force with 250 deficiencies, then we will get a sole source contract.

That is a heck of a way to do business.

Mr. LONG. And as in the past, we (the contractor) will have only lost $350,000, and, on the program.

Mr. DICKS. I am just giving you the facts.

Mr. LONG. You are giving part of the facts.

Mr. DICKS. Mr. Fitzgerald was a hero, in my book, for pointing this out, and he was fired.

Mr. LONG. I am not sure what the question is.

DECISIONS TO PRESERVE INDUSTRIAL BASE

MR. DICKS. The question is, Is that the way to really reward performance? Are we going to set an example for the rest of the industry, for everybody else in defense contracting when we do this? If you did it on the basis of industrial base, then why don't you admit it?

Why doesn't the Administration have enough courage to come up to Congress and say, we want to preserve that industrial base; that is why we made the decision. We know it flies in the face of all of the process, of the recommendations that were made to us by the Air Force; we know it doesn't meet eight out of ten of the Mission Element Needs Statements, but we are going to do it because we want to keep Lockheed in this kind of defense business.

Why don't you have the guts to make that kind of statement rather than trying to justify it on the merits?

I have heard this from industry people say—why do we want to go out, get into a competition, spend $50 million of our own money—which Lockheed, McDonnell-Douglas and Boeing did in the C-17 competition—make a good faith effort to try to present the Administration with a good quality plane for the next 20 years, when they throw all that out and go ahead sole source to a company that has failed them in the past.

That doesn't make any sense. We are talking here about procurement practices. I don't see that that sets a good example. If that is a Carlucci initiative, I think it is an initiative in the wrong direction.

Mr. LONG. Again I am not sure what your question is. Do we consider contractor performance? Yes.

Mr. DICKS. Or lack of it?

Mr. LONG. Or lack of it.

Are the historic C-5 events accurately portrayed in your question?

Mr. DICKS. Those are all facts.

Mr. LONG. They may all be facts, but they are not all the facts.

For example, you didn't touch upon the issue of whether we, the government, had any responsibility in the way we put the specification package together.

I think if you look at the record, you may find some substantial questions about that. I don't think it is fair and I have no ax to grind for Lockheed. Lockheed, in my judgment, is an important part of our supplier base, but so are a lot of other companies.

Mr. DICKS. Do you think you should be honest with the Congress and honest with the American people? Instead of trying to go through some kind of competition and reversing it and sole-sourcing 50 planes to Lockheed, shouldn't we say we are doing this because we are concerned about the industrial base? We know the decision can't be justified on the merits because clearly the C-17 is a superior plane and the one we ought to build for the long term, but we are going to do this because we are concerned about the industrial base.

Wouldn't that be better to do? Then all the contractors can at least understand it. We are not trying to say we are doing this on the merits, when clearly on the merits you can't make that kind of decision.

Mr. LONG. Well, I suppose, as I said in my comments to an earlier question, reasonable people can differ. You may analyze, or I may analyze a particular decision and conclude that there is a hidden agenda.

Mr. DICKS. I don't think it is bad.

Mr. LONG. But you asked, wouldn't it be better for the Department or the Secretary to be honest with the Congress and the American people? Of course, that is an integral part of the way we operate. You imply in the next question that we are being dishonest.

Mr. DICKS. I don't see it as being dishonest. I see it as you are not leveling with us. You are not giving us the straight, direct answer. You are doing something; you are trying to justify it on the basis of whatever you can but you are not really saying that the industrial base is part of the consideration.

What I am trying to get to: Is it wrong to justify a decision on the industrial base?

Mr. LONG. It is absolutely not wrong to justify it. I don't know whether that is part of the decision here. That is all I am saying. I do not have any reason to believe that we are playing games with you or that we are being intellectually dishonest.

Mr. DICKS. I am not blaming this on you at all. I am just saying there has been a tendency in the past to frown on admitting that we are doing something for industrial base purposes. We rarely see that as a justification for a decision. We always try to justify it solely on a competition.

Mr. LONG. Let me clarify that. We make lots of decisions for industrial base reasons. We have dual source productions for industrial base reasons. We have minimum sustaining rate production contracts. We will split production up for industrial base and mobilization base reasons. It may well be that the specific large programs that get visibility are not related to industrial base decisions.

I don't disagree with the Secretary in his analysis of the C-5. You may disagree that it is the industrial base. I agree with his decision. We do a lot of things daily for industrial base, mobilization base reasons.

Mr. DICKS. Are some decisions of the services overturned because of industrial base considerations?

Mr. LONG. Without being able to give you off the top of my head a specific example, I would be surprised if there weren't at times some changes in these decisions. Whether we overturn or suggest other factors to consider, we are not dictators. We ought not to be. We ought to try to do this together. I am not sure overturned is the right way.

Mr. DICKS. How many contractors have you eliminated from source selections in the past year based upon poor prior performance?

Mr. LONG. I will have to give you that for the record.

Mr. DICKS. Do you know of any off the top?

Mr. LONG. May Mr. Gordon respond to that?

Mr. DICKS. Anybody. Any of your cast of witnesses.

Mr. GORDON. In the case of the MX contracts on the reentry system, the Air Force awarded a contract to other than the lowest price offeror and other than the offeror with the superior technical proposal on the basis that his past performance was not satisfactory.

Mr. DICKS. Is that ABRV?

Mr. GORDON. Yes.

Mr. DICKS. Staff tells me that is the one contract you awarded without authorization.

Mr. GORDON. No. We are talking about the original reentry, not the multiple.

Mr. DICKS. Not the advanced?

Mr. GORDON. Not the advanced; the original one.

Mr. DICKS. You can't think of any others?

Mr. LONG. Let me respond to that for a moment. We have as a result of this initiative an ongoing effort to determine a rational basis to apply past performance, whether it be positive or negative, to the source selection process. It is not something that is easily done. You may recall that ten years or so ago there was a program of data collection on a DOD-wide basis seeking to build a file, if you will, on contractor performance, so that the source selection activity could go to this file and review past performance evaluations of various offices. Nobody here was a part of that process. I am told

that it turned out to be, number one, very late because it was trying to amass so much data, that it almost wasn't useful; number two, very cumbersome; number three, it tended to contain information that was, I will say, neutral, never glowing, never condemning.

One of the problems that resulted or led to this latter point was the legal process that we have built around our procurement system. I'm not saying it is wrong or right. I am simply telling you it is there.

Mr. DICKS. Don't be afraid. You can tell us if it is wrong.

Mr. LONG. It is tied into due process.

Mr. DICKS. Let's take my example. Say you have the $2 billion overrun, the $1.6 billion for rewinging, 250 deficiencies with a plane when it got there, and let's go through that.

Do we have to protect the contractor there? Under due process?

Mr. LONG. I just don't think we can take that example, Mr. Congressman.

Mr. DICKS. It is a good one.

Mr. LONG. Well, it isn't a good one. There are hundreds of thousands of pages on the subject as to where the fault lay. You are ascribing that fault to Lockheed. I don't think the analysis will say that it is all Lockheed's fault.

Mr. DICKS. Part of it was the Air Force?

Mr. LONG. Part of it was X, part was Y, et cetera. Part may simply have been the aircraft itself; not new components, as I understand it, but a new sizing and a new process. So I would rather talk about it in the abstract, because I don't think your example is a fair one to describe the point I am trying to make.

We do have a system of due process if we are going to put something in the files. I don't care whether it is the Department of Defense or the Department of Energy or anybody else. If that is going to have an adverse effect on their future business, then we believe as a nation that the individual or company ought to have an opportunity to comment. That is the due process.

CONTRACTORS WITH MULTIPLE OVERRUNS

Mr. DICKS. Recent Nunn Amendment reports have revealed very large cost overruns in a number of ongoing programs. In some cases, a given firm is showing simultaneous cost overruns on several programs for which it has contracts.

How is DOD reacting to such cases of simultaneous overruns?

Mr. LONG. With respect to the Nunn Amendment, within OSD as well as the relevant military departments, there has been a continuing and very strong dialogue with contractors who have repetitive or multiple cost overrun experiences or cost growth experiences.

I can tell you from my own knowledge that in one of those circumstances it has resulted in the senior management of the company increasing by a substantial margin its individual attention to the programs that we are talking about. We haven't canceled out a contractor. We haven't said, Mr. Contractor, with these five programs, we are going to terminate all these programs because of your overrun. You know the consequences of that.

We largely have to start over. I don't mean to say that we are only concerned about cost problems where a contractor has more than one contract in trouble. We are concerned about costs in all contracts. We have directly interfaced with the highest management.

INCREASED COST GROWTH IN WEAPONS SYSTEMS

Mr. DICKS. Let me just size the problem for you a little bit. According to my information, the SAR, the Selected Acquisition Report, for the last 90 days of 1981 showed an increase in the major weapons systems that we are procuring of $150 billion, a jump from $304 billion to $454 billion. Part of that is increased quantities, but a substantial part of it is cost growth.

That to me indicates that this is out of hand. It seems to me that we are going to have to get a handle on procurement costs because if we don't, there is not enough money available to afford the acquisition of these systems in the time frame in which the Administration is talking about. If that is accurate, then it means we will have to stretch those programs which will mean further increases in cost.

Aren't you, as the Deputy Under Secretary for Acquisition Management, deeply distressed and concerned about $150 billion increase in the last 90 days of 1981?

Mr. LONG. Absolutely.

Mr. DICKS. What are we doing about it?

Mr. LONG. First of all, I would refer you to the statement that Alice Rivlin made before one of your colleagues analyzing that growth. I suppose it is a matter of degree how much of it is attributable to one factor or another.

Mr. DICKS. You are the guy I want to talk to. Alice Rivlin is a nice commentator, but you are the person with the responsibility. I have her analysis. It is quite good. I agree with it.

Mr. LONG. The point is we are not only concerned about cost growth; we are concerned about costs. The initial cost baseline may not have been appropriate. So it is not just cost growth. It is overall costs we are concerned about.

Mr. DICKS. My hero over there, one person I think is really trying to do something, is Under Secretary Ambrose of the Army. He says we have to fight inflation, too. We shouldn't just roll over and accept cost growth or inflation. We should be fighting inflation.

Tell me, what is the Administration doing on these programs? I think the B-1 was up from $20 billion to $28.9 billion in the SAR; something this committee predicted, by the way.

What are we doing on that? Are we doing anything to fight inflation, fight these cost growths, these increases? $150 billion seems a lot to me.

Mr. LONG. Yes, Mr. Congressman. There are lots of things that we are doing. We are trying to limit the effects of our own desires to always field the most technologically advanced systems. You look at the DOD Acquisition Improvement Program; a number of desired changes to some of our weapons systems have not been approved.

COMMERCIAL EQUIPMENT

Mr. DICKS. How about buying off the shelf equipment that is existing and less expensive than highly expensive weapons systems we have that are basically as effective? Are we doing any of that? Should we be?

Mr. LONG. We should be doing as much commercial buying as we can to the extent that there is commercial equipment available that meets the requirements. It is an ongoing program that, as you know, predates this Administration and it is one that we are giving a great deal of emphasis to. We are also trying to increase by a substantial amount the extent to which we standardize some of our subsystems. Standardization is fought by many because it is thought to be, in my judgment improperly, an inhibitor to innovation. It is clear, however, that to the extent we successfully standardize components and subsystems, we have a better handle on costs.

Those are a couple of the things I am referring to.

TECHNOLOGIAL CHANGES TC WEAPONS SYSTEMS

Mr. MURTHA. Mr. Secretary, you talk about technical changes which increase costs, what percentage of the cost increase is due to the technical change?

Mr. LONG. I just don't have that off the top of my head.

Mr. MURTHA. It worries me that we won't make these technical changes. I am thinking about the ships that were sunk in the Falkland Islands. I don't know all the details, but I wonder if they didn't cheapen their ships and possibly make them more vulnerable to antiquated missiles by maybe not putting on electronic countermeasures and that type of thing?

Enter that in the record, if you will, if you have those figures.

Mr. LONG. I will.

[The information follows:]

Selected Acquisition Reports transmitted to Congress for December 31, 1981 reflect a total current estimate of Program Acquisition Cost of $454,833.3M. This compares to a Current Estimate of $340.328.6M reported in the September 30, 1981 quarterly report. Net change of Current Estimate between these reports must be adjusted for changes in weapon systems included, excluded in the above totals. Net change between these two quarters is summarized below:

	Current estimate
September 1981	$304,709.0
Minus Deleted Sars (SURTASS, PLSS)	−1,336.9
Added SARS (B-1B, CVN-72/73)	+36,956.5
Adjusted September 1981 Value	340,328.6
December 1981	454,833.3
Net change	+114,504.7

Of the $114,504.7M adjusted net change between September 1981 Current Estimate and the December 1981 Current Estimate, $15,282.3M or 13.3 percent was related to technical changes.

Mr. LONG. Let me also make a comment. I don't mean to imply that a decision not to go forward with a technological change is mindlessly made simply because it costs more money.

Mr. MURTHA. Let me interrupt you on that point.

This worries me. The Secretary of Defense has said that the B-1 is going to come in under $20 billion. We predicted it will not come in under $20 billion. What we see, sitting on this committee for a

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few years, is that changes have to be made that do increase the cost.

When you say you are going to keep it under $20 billion, what the gentleman from Washington is suggesting happens, you either buy less airplanes or get a technically less sophisticated airplane that is not worth anything when you get the thing finally built. Both those problems have to be balanced.

Mr. LONG. A technically less sophisticated weapons system is not equated to a worthless weapons system.

Mr. DICKS. I agree with that.

Mr. MURTHA. Unless the Soviet Union has more sophisticated weapons and can fire at half mile longer distances or something like that. That makes a big difference.

Mr. LONG. It is a matter of threat assessment. We recognize that.

Mr. MURTHA. If you say a $20 billion limit—I know we have to put a stop some place—but if you say a $20 billion limit—you are either going to buy less airplanes or you will not be able to take into account the increases in technology we have in the future. We are saying the cost is going to increase. I want to know what percentage of increase is due to these technical changes?

Mr. LONG. I will get you that, Mr. Chairman.

[The information follows:]

Major Air Force programs have a recorded cost baseline called the Development Estimate. Changes to the Development Estimate are documented in one of seven possible cost categories. Technological changes and improvements are included in the engineerig changes category. The following table shows the engineering change costs as a percentage of total change cost for representative Air Force programs:

Percent of increase due to engineering changes

Program:	*Percent*
F-16	30
DSCS-III	15
GLCM	5
B-1B	0

As you can see the percentages differ from system to system. The B-1B, for example, is a mature and stable design which already incorporates many technological advances made since the original B-1A was designed (e.g., state of the art avionics, air launched cruise missiles, radar absorbing materials, etc). In addition, this B-1B design has been successfully tested against various U.S. systems representative of current and postulated future threat systems. The results of these tests in conjunction with other DoD analyses indicate that the current B-1B will have the capability to successfully penetrate projected Soviet air defenses well into the 1990s; therefore, no major changes in the B-1B, are anticipated. If a significant technological breakthrough were to be achieved that could be applied to this B-1B that would substantially enhance the weapon system capabilities, we would certainly evaluate incorporating that capability within the strict cost and change control procedures directed by the Deputy Secretary of Defense.

Mr. LONG. I think we will find that different programs have different cost elements related to these changes than other programs. I don't think there is a model that will fit largely all programs, but I will get you that answer.

Mr. MURTHA. Mr. Dicks?

COMPETITION IN WEAPONS SYSTEMS

Mr. DICKS. General Connolly, you are with the Air Force Directorate of Contracting and Manufacturing Policy.

Let me ask you, does it help where we have the kind of situation we had in terms of contracting when we went through the advanced medium STOL transport competition? Contractors spent a

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lot of money on competition; we terminate the program. Then we go through a new program; C, where the Air Force and the Army get together and lay out their Mission Element Needs requirements; you have a competition between the major manufacturers; Boeing, Lockheed, McDonnell Douglas; McDonnell Douglas wins the contract. They spent a lot of their money; $50 million of their own resources on this effort to deal with the Air Force in good faith thinking if they win they will have a chance to build the new airlifter for the next decade.

Then all the Air Force officials go in to the Under Secretary of Defense and present their case unanimously in favor of the C-17; This is the right plane, Mr. Secretary, et cetera, et cetera. Then that decision is reversed; there is a sole sourcing of 50 planes to Lockheed. How do the contractors react to that? Does that hurt our ongoing relationship with, say, for example, a company like McDonnell Douglas that won the competition fair and square?

Does that benefit our relationship with the contractors that do business with the Department of Defense? In your personal and professional opinion?

General CONNOLLY. I would say in my personal and professional opinion, McDonnell Douglas would be very disappointed that they didn't get the contract, but they are still a defense contractor, and an Air Force contractor. Part of the decision was to buy some more KC-10s, which—they have to consider that as well. They are getting additional business.

I think from a long range point of view, they won't be completely—we haven't completely strained relations from now on with McDonnell Douglas.

Mr. DICKS. Doesn't that create a lack of confidence within the contracting community when these kind of decisions are overturned after a competition, after they have gone out and done all this work, made a proposal, it is evaluated and they win?

I don't see how that could possibly increase confidence within the industry that they are being treated fairly by the Department of Defense.

Mr. MURTHA. How much were they reimbursed for the R. & D. costs?

General CONNOLLY. They will probably be reimbursed for some of the bid and proposal expense. I don't have those numbers.

[The information follows:]

To date none of the C-X competitors have been directly reimbursed for their R&D efforts during the bid and proposal phase of the C-X source selection. However, each contractor may have incurred independent research and development costs associated with the C-X program. A portion of these costs will be indirectly reimbursed by DOD on current or future contracts through indirect expense allocation.

Mr. DICKS. See, they put in their own money. You know how this gets. They want to do a good job. They want to make the best possible presentation. Every one of these competitors, I can tell you, put in a lot of their own corporate money into those competitions because the other people are doing it, it is competitive.

What worries me is the litany I hear going around the country talking to contractors. It goes like this: First, the Department of Defense is not a good customer. As we mentioned, they much prefer to do the commercial work if they can do it. Defense busi-

ness is uneven; sometimes it is on an annual basis; contracts can be canceled. All of these factors add to the instability in the industrial base.

Subcontractors say, why do we want to get into this? The regulations are incredible; the chances are we are going to have problems with our customer; they are staggering compared to the commercial sector.

Then we get into a competition like this where the Air Force, the Army, the President all say we need this new airlifter in order to do the job correctly; there is a competition; all of a sudden at the highest levels, after the competition, that is overturned.

I think it raises a credibility question about how the Department of Defense conducts is business and adds to that uncertainty, adds to that disgust, if I might characterize it that way, of contractors for how we conduct our business.

I think that has to hurt us, because as more and more people see that and understand it, then there is a lack of willingness to do business with the Government which is hurting us in terms of the industrial base.

Is that fair?

General CONNOLLY. I will comment on the uncertainty. It adds some uncertainty to the Defense market and the available programs. I will grant you that.

The decision on the C-X was based on, as I understand it, the funding availability for the program and the—also the initial operating capability that was required. The Secretary of Defense made additional funding available for the Air Force a little earlier.

So, it was decided that——

Mr. DICKS. Wait a minute. Let's get to that right now. How can that be with the Latta budget which calls for a reduction in expenditures now? That was back in January. Now we have a new budget reality. We have to cut Defense. Where is this magical $3.7 billion now that is supposedly available for the acquisition of C-5's? Where is that going to come from now in light of the new realities?

One, you have escalation in cost of existing weapons systems and you are going to have to make cuts in Defense. Is that $3.7 billion still available under these circumstances?

General CONNOLLY. That I can't answer, but I think what we will do is look at all our priorities and all our programs with the available resources we have and priorities and decide accordingly.

Mr. DICKS. Do you see a lot of stretchouts on existing programs in order to get all the noses under the tent?

General CONNOLLY. I can't tell you right now how the analysis is going to come out. When we look at what is going to be available, the resources we are going to have, then to go through the analysis of what programs——

Mr. DICKS. The Air Force is going to have to take part of these cuts; is that not correct?

General CONNOLLY. I presume all of the services will have to look at their programs and I presume that we will have to individually take some adjustments.

Mr. MURTHA. The time of the gentleman has expired.

Twenty minutes.

Mr. LONG. May I interrupt? Mr. Pyatt asked to be recognized. He has a comment on one of the earlier questions.

REDUCING INFLATION

Mr. PYATT. To add to the 20 minutes, you asked about what are we doing to flatten inflation. I think that has to be an issue taken up in the contract between Defense—the Navy in our case—and the contractor. Our approach to that has been to toughen the share lines 50-50, use fixed price earlier than you would often find in other contracts and to negotiate very tight targets. This, to us, provides the contractor incentive to control his costs and—on a day-to-day negotiation with suppliers and things that he buys. It is kind of the best firsthand way we know to work on the inflation portion of the problem.

Mr. DICKS. I am glad he raised this point.

Mr. MURTHA. Is it working, though?

Mr. PYATT. We think so. The contracts are tough to come to grips with. From what we can see in the time we have been doing it, roughly a year, the contractors are showing cost consciousness in their production and sticking to their targets. The driftoff of targets is slower than it had been. The motivation is there. Time tells more.

Mr. DICKS. If I can finish up on this point. Mr. Pyatt, you made a very good point. Mr. Ambrose makes a suggestion that is very, very important. He says the contractors put their very best people, their most able people, into the process of drafting the contracts between the Defense Department and the contractor.

His point is that we don't always have the most able people in that process, that it is not considered a high level job within the Department of Defense; and one of the reasons we have all of these probems stems from the fact that we do not have the same level of talent competing against the industry talent in terms of drafting these contracts under which we are purchasing the equipment.

He feels that that is one area that we need to improve on in the fight against inflation. What do you think about that?

Mr. PYATT. One of the hardest professions we have to keep amply filled with quality people is contracting folks.

Mr. DICKS. You would agree with the Secretary?

Mr. PYATT. Yes, without in any way denigrating the people dedicated to doing their job and doing I think a very fine job——

Mr. DICKS. If they are competing against somebody from Covington & Burling, Arnold & Porter——

Mr. PYATT. Those guys draw $250,000 a year or half a million, against a GS-7's salary; you know where the balance lies.

Mr. DICKS. Is there anything in the Carlucci initiatives to deal with this by elevating the level of these people?

Mr. PYATT. May I add on for a second? They have provided every support that we can get within the Defense Department to maintain and hold our contracting staff. I think this was an issue raised earlier of what is OSD doing; and I feel their support, but it is a continuing—it is like many other battles around this town. It is one that you just can't let up on.

Mr. DICKS. What Mr. Ambrose told me was that many of these problems stem right back to that contracting. The government winds up having to pay more; they didn't have the loophole closed.

Mr. PYATT. They go back to the contract and to the technical specifications.

Mr. DICKS. We wind up paying for not doing a good job, being a tough enough negotiator right at the start?

Mr. PYATT. Or being an imperfect foreseer of events.

Mr. DICKS. Mr. Long, what about the Carlucci initiatives? Is there anything in this you are trying to do to deal with this fundamental problem?

Mr. LONG. I don't think you can look to the initiatives and find something that says increase the stature of competence, et cetera, of contract negotiators. Each of the military departments and OSD has a continuing concern that we have good people and that they have the proper tools, including training, to work with.

I guess there would be differences of opinion within the Department on the extent to which this is a real key driver to some of our long term problems.

One of the things we are concerned about, however, is a proposal within the Office of Personnel Management that would have the effect, of downgrading the stature and level of the procurement professional in the occupational series—1102. We have told OPM this proposal is directly contrary to what we are trying to accomplish by way of improving the process because the bottom line is you are not going to improve the process unless you improve the people.

Mr. DICKS. I hope you do more than just dialogue.

Mr. MURTHA. The committee will now adjourn until 1:30.

AFTERNOON SESSION

PROCURING AIRCRAFT AT ECONOMICAL PRODUCTION RATES

Mr. ADDABBO. The committee will come to order.

DOD issued a document entitled, "Economics and Efficiencies, Department of Defense" which stated that savings, amounting to millions of dollars, were achieved by procuring at economic production rates. Several examples of those items include the: SH-60B LAMPS MARK III Helicopter; CH-53E Helicopter; A-6E Attack Aircraft; F-14 Aircraft; and P-3C Aircraft.

We have recently heard conflicting testimony where the witnesses insist that these particular aircraft programs are not being procured at economical production rates. Can you explain this apparent discrepancy? Just how do you justify these alleged savings?

Mr. LONG. Let me answer your question generally first and then I will ask my colleagues to go into the specifics. The objective of economic production rates is to buy better than we have. It isn't often easy to identify the precise, most economical rate in equipment such as we are talking about. The objective is to do a better job of buying more economical quantities.

One can also look at a particular annual or monthly rate and say if you made one more per month, you would bring the unit cost down. I don't think any of us would pretend to be able to say that

in these instances we are without question, buying at the most economical rate. We are simply trying to do a better job. We are trying not to stretch programs out to less economical production rates simply to finance more programs.

Generally in that list, I think we are doing a better job of buying at more economical rates than we have in the past. I cannot address each one specifically, but I would ask my colleagues here if they could address each of the particular aircraft. General Connolly?

General CONNOLLY. Most of these are Navy aircraft. I defer to the Navy on that.

Mr. ADDABBO. Mr. Pyatt?

Mr. PYATT. There are several points of reference, I guess, on each of these. The first proposal on the LAMPS III envisioned a four year production profile which I think is probably the most efficient rate. From a production point of view whenever you go to a slower production rate, it raises production costs. You also must get into other issues involved in how many you need to take care of the fleet and what base you use them at and those issues have all been aired.

The CH-53, I believe that is at a higher rate than it was in 1982; therefore, a more efficient rate. The A-6E is in the same situation, but with the current authorization bill, there is a problem whether the program will continue or not. That is one of our proposals for multi-year procurement. The F-14 production rate is also up from 1982, as I recall.

Mr. ADDABBO. Mr. Pyatt, when you say they are up, are they up because the authorizing committee has increased them? The 1983 budget, if I remember correctly, reduced them. The authorizing committee has increased them. So the Congress has increased it, but your office has decreased.

Mr. PYATT. I think——

Mr. ADDABBO. Except for the SH-60B. All the others were increased by Congress actually under the budget presentation it was under 1982; all the items except the 60B. Is that correct?

Mr. PYATT. That is not what my notes have here. I think I should furnish it for the record.

Mr. ADDABBO. The other thing that concerned me is the only one that had been increased was the SH-60B. Recently we saw an unofficial copy of Secretary Weinberger's so-called "hit list." It is a list of recommended or proposed fiscal year 1983 program reduction submitted to the Senate. Low and behold, we find the LAMPS MARK III Helicopter production quantity cut by 50 percent and then we also see the A-6E, the only all-weather day/night, attack aircraft we have. I wonder if the right hand knows what the left hand is doing over there in procurement.

You talk about savings. All of a sudden——

Mr. PYATT. We are having to make a set of budget adjustments. The savings we talk about are lost. That is one of the frustrations in trying to keep programs running together.

Mr. ADDABBO. That is why we are having problems with the procurement policies. I wish somebody over there would straighten it out.

Mr. PYATT. It all begins with establishing production rates.

Mr. ADDABBO. The gentleman from Pennsylvania, Mr. Murtha.

Mr. MURTHA. Mr. Pyatt, did you say the stretch-out of the production rates will substantially increase the costs overall?

Mr. PYATT. Stretch-outs do two things in cost. They first reduce the volume going through the production line, and increase costs by virtue of fixed costs which are spread over fewer units. You usually wind up buying the same airplane at a later year at more inflated prices. You have to start looking at maintaining a force balance. There are two components.

Mr. MURTHA. The inflated prices, that is one thing. Does the real cost increase if you delay the line?

Mr. PYATT. If you load a production line less heavily, put fewer airplanes through the same facility, there is almost invariably an increased unit cost.

M–1 TANK PROCUREMENT QUANTITIES

Mr. MURTHA. Take the example of the tank. I thought we were going to get up to 90 a month on the M–1 tank. I understand there has been a limit put on by the Defense Department of 60.

Mr. PYATT. I can't speak to the tank, sir.

Mr. MURTHA. Can anybody?

Mr. LITTLE. That is right.

Mr. MURTHA. Mr. Little, what will that cost us to reduce the number from 90 to 60?

Mr. LITTLE. I don't have the exact figures.

Mr. MURTHA. Would you put that in the record so we can see what the real cost increases per unit are? That is what I would be interested in.

Mr. LITTLE. You realize we are not producing but about 40 to 45 tanks a month now.

[The information follows:]

The Army is uncertain about the precise effect of the proposed $200M cut in the fiscal year 1983 M1 budget request. However, assuming the fiscal year 1983 tank buy is reduced to 720 M1's and those same tanks are bought back in subsequent years, an increase of about $20,000 per unit can be expected.

Mr. MURTHA. As I understood it, we went to another tank factory. There are now two tank factories operating. What is the capacity of those two tank factories?

Mr. LITTLE. 90.

Mr. MURTHA. What is the optimum figure? Do you know what that would be?

Mr. LITTLE. We think that is about it.

Mr. MURTHA. 90 would be the figure that would be the most economical buy? What we are doing then is increasing the cost. You will put in the record whatever that cost per unit is?

Mr. LITTLE. Yes, sir.

[The information follows:]

The escalated M1 total program unit acquisition cost, as reported in the Selected Acquisition Report, is $2.77M at the 90 a month production rate. If the production rate is reduced to 60 M1's a month, the Army estimates the escalated total program unit acquisition cost would be about $3.0 million.

Mr. MURTHA. Proceed.

QUALITY OF CONTRACTING PERSONNEL

Mr. LONG. Immediately preceding the break for lunch, we were talking about personnel and the quality of personnel. Several others here would like to make some additional remarks on that subject.

General Connolly?

General CONNOLLY. Yes. I would like to clarify a point. I think the way we left it it indicated that perhaps the Department of Defense negotiators were being outgunned by industry negotiators at the contract negotiation table. I would like to indicate that—speaking for the Air Force—in our major programs, we put the best possible people that we have together to negotiate our major contracts.

Mr. MURTHA. Not to interrupt you, General, but I was left with the impression that because of the difference in salary, industry is able to pay more and is able to get higher quality people. Is that what you are arguing with?

General CONNOLLY. No. I am not arguing with that. I think we have equally qualified people that do our negotiations. In fact, industry gets a lot of their people from the people we train. Our goal is retention, keeping the experienced people that we do have.

Many of the techniques that we use in negotiation and the pricing of contracts, industry follows. We sort of develop those and eventually they wind up in industry as well as some of our people. We have very strong career development programs to develop our people in the techniques of negotiation; and in contracting in general.

I particularly would stack our people up—particularly those that handle major programs, with any of those from industry.

Mr. MURTHA. How long does it take you to train an individual in this area?

General CONNOLLY. I would say it would take, to get a man or person, lady or gentleman, to handle a major systems contract negotiation, I would think they would have to have about 8 to 10 years experience.

Mr. MURTHA. What is the average time of the people in the Department that handle these contracts? Over 8 to 10 years?

General CONNOLLY. I would think our experience level is higher than that. I would say we are up to 15 to 18 years. For the record, I

would have to provide that to you. We have quite a few experienced, level people. I think we had a LMI study done several years ago. The Air Force came out in the 17 to 18 year experience category. We still have a retention problem. We do lose some of our capable people.

[The information follows:]

The average experience level of the negotiators for ten major systems contracts negotiated in the last year is 16 years. The experience levels ranged from 7 to 31 years.

Mr. MURTHA. Is it purely money? Is that the reason?

General CONNOLLY. Some of it is money, but I think challenging jobs is another.

Mr. MURTHA. Isn't there a certain point where they believe they would be better off to stay until they have 20 years and then leave?

General CONNOLLY. We have two problems. We have military contracting people and also civilian; but most of the civilians I think stay around to perhaps 55 or maybe longer. The military tend to leave somewhere around—anywhere from 22 to 26 years, particularly our sharper colonels.

Mr. MURTHA. So the impression created this morning, even though the civilians were paid a much higher salary, you still feel that your people are just as well trained, they can do just as good a job?

General CONNOLLY. That is right. I feel that. Particularly on major programs. I can't say across the board on every procurement we have, we may have inexperienced people; but on the major, important programs, where the dollars involved are significant and substantial, we put our best talent on those. I will match those up against any in industry.

Mr. MURTHA. I think then that is the opposite of what I understood this morning.

Mr. PYATT. Since I am responsible for leaving you with the impression, I would like to first of all say that the people that we have do a fine job. I would also like to say we still run into those kinds of situations I described this morning of first class, very experienced, very talented and very skilled people being brought in to negotiate across the table; and there are still imbalances. We try hard. It is tough. We are in a buyer's situation and not the seller's. That is an advantage in itself.

We don't mind walking away from the table, if that is what it takes; but keeping our procurement talent strung together and supporting the proficiency in the civil service and in the military is a problem that requires constant attention.

Mr. MURTHA. It seems to me the single source would be your biggest problem.

Mr. PYATT. Oh, yes.

Mr. MURTHA. If you don't have competition, that is where you have the biggest problem.

Mr. PYATT. That is right. Like the Air Force, all the capabilities available to us throughout the Defense Department, the audit services, our own contracting officers; we have all of those. But it is no simple feat. When there are millions of dollars involved in some of these contracts, contractors don't take a lot of chances.

Mr. MURTHA. Let me ask you this question now. You are negotiating, you work for the government and make $25,000 a year; industry is impressed by your negotiating; do you lose a lot of those people to industry?

Mr. PYATT. We lose a lot of middle level people with 4 to 10 years of experience.

Mr. MURTHA. Do you have any idea what the percentage would be?

Mr. PYATT. I have to furnish that for the record.

Mr. MURTHA. I would be interested in the number of years it takes to train an individual. Plus the average salary and the number of years they have before they are attracted to industry. Obviously, you wouldn't know what the salaries are, but it must be substantially higher.

[The information follows:]

The annual separation rate for contracting series civilian personnel in the Navy is about 11 percent. This rate has held steady over the past six years and reflects the Navy's loss of personnel to all causes irrespective of length of service. The principal reasons for leaving Navy service are, in order of prevalence: regularly scheduled retirement, transfer to other DOD components, transfer to other Federal Agencies, and cross over to Industry. In the case of cross over to Industry, the annual separation rate due to this cause is slightly less than 3 percent. The preponderance of those leaving for jobs in Industry have between 4 and 10 years of service. The seasoned highly experienced, and well trained Contract Negotiators with over 10 years of service are not generally attracted to Industry until they reach retirement age. Instead, those in this mid-level category tend to be lost to other DOD components and the Civilian Federal Agencies due to offers of higher grades.

It takes the Navy 7 to 10 years to train a Contracting Officer to the point where he has the minimum skill level to perform effectively as a Contract Negotiator on a major systems program or in the most complex, high dollar procurements. To fully develop a contracting Officer to the point where he is an expert negotiator capable of handling independently the more complicated and demanding negotiations takes between 14 and 16 years. For these two skill levels the salaries are in the range $28,000 to $33,000 and $36,000 to $42,000. With respect to the question concerning the number of years a negotiator has before he is attracted to Industry, as was noted above, the highly proficient mid-level negotiator, who by this time sees himself as a careerist, is not easily attracted to the private sector before he is in a position to retire from the Navy. In this regard, there has been decline over the past six years in the average age of the procurement work force that is over 50 years of age (i.e., from 49 percent in 1975 to 35 percent in 1981). This is indicative of the rise in the number of professional negotiators opting for retirement at the earliest opportunity (i.e., at age 55) in order to pursue second, more lucrative careers with Industry.

Mr. PYATT. This is a long standing thing as Mr. Long mentioned a minute ago. For some reason I cannot explain, and I have followed it through a couple of times, civil service performance standards tend to downgrade, for lack of a better word, the professional qualities of the contracting officer. This little process of setting personnel standards for contracting officers is one that makes it very rough to get the right grades, to get the pay where they count. It has been a continuing problem with the Civil Service and OPM.

Mr. MURTHA. Do you have any merit bonuses or anything like that that you can pay a person who does a particularly good job to hold them?

Mr. PYATT. Oh, yes.

Mr. MURTHA. Has that been successful?

Mr. PYATT. In the civilian world. In the military world it gets rewarded in another way. I guess, overall, if you talk to the people

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with broader personnel experience than myself, you will get more of an answer. The jury is still out on how effective that has been.

Mr. LITTLE. With the direct push from Under Secretary Ambrose, the Army is making a strong effort to upgrade its negotiators, particularly; and we expect that we will in time have a better grade of people in that job than we now have.

Mr. MURTHA. What are you doing to upgrade them?

Mr. LITTLE. We are first reviewing where we are and what we need to do to upgrade them. We just started this in the last two or three weeks.

Mr. MURTHA. Anything to add?

Mr. LONG. No.

ECONOMIC PRODUCTION RATES

Mr. ADDABBO. Mr. Pyatt, in the office of Mr. Long, who is in charge of acquisition management, you are listed as Principal Deputy Assistant Secretary Navy, Shipbuilding and Logistics. Is that for acquisition?

Mr. PYATT. Yes, I work for George Sawyer. The way the Navy is organized, the Secretarial responsibilities for procurement fall in this office.

Mr. ADDABBO. So you wouldn't have too much to do as far as the purchasing of the planes that I spoke about before?

Mr. PYATT. All the procurement, the production.

Mr. ADDABBO. Then why would you tell me you don't know what the quantities are and that they are increased? I am looking at the justifications. The A-6 was 12 in 1982 and 8 in 1983. The F-14 was 30 in 1982, 24 in 1983. The C-53 Helicopter, 14 in 1982, 11 in 1983. The P-3C is 12 in 1982 and 6 in 1983. The LAMPS, forget about. That was cut 50 percent.

Maybe that is the problem. You fellows aren't looking at management or acquisition. You come before me and testify that you have increased it.

Mr. PYATT. Mr. Chairman, I made a mistake of reading some of the background stuff that was prepared for me.

Mr. ADDABBO. That is what I am concerned about. Who is preparing this background stuff? A lot of information we give to you. You come back and say background stuff. I am wondering, maybe that has been the problem with procurement procedures. Some of these background people don't know what the heck they are doing and are not following through, not really—they are just taking, as I said earlier, just taking the military's word for everything that is going on. They are saying well, the military says it is increased, so therefore it has to be. Nobody is checking anybody.

Mr. PYATT. No, sir.

Mr. ADDABBO. I am sorry to take you to task on this. This is a simple matter.

Mr. PYATT. I think it is entirely appropriate. The facts I gave you were apparently wrong. I need to apologize for that. We will provide it correct for the record. Also, I will say we have been involved in the contracting process for the P-3 and have driven down the prices on that and also for the F-18 as part of the firsthand discussions.

[The information follows:]

The chart below compares fiscal year 1982 and fiscal year 1983 major combat aircraft procurement programs. Over the past year there has been a significant increase in both the approved and planned procurement force levels. On a system by system basis, several aircraft show reduced procurement buys in fiscal year 1983 compared to fiscal year 1982. However, in the aggregate there is a significant rise in planned procurement levels in fiscal year 1983 compared to fiscal year 1982. The Authorization Committees have proposed adjustments to a number of these programs, both increases and decreases. Overall, however, both Authorization Committees would procure fewer aircraft in fiscal year 1983 compared to the President's budget submission.

MAJOR COMBAT AIRCRAFT

	Fiscal year 1982	Fiscal year 1983
F-14	30	24
A-6E	12	8
EA-6B	6	6
F/A-18	63	84
AV-8B	12	18
CH-53E	14	11
SH-60B	18	48
P-3C	12	6
E-2C	6	6
SH-2F	18	18
Total	191	229

Mr. ADDABBO. We have been giving you the questions before the hearings under a prior agreement. Your people come back with answers like that. Something is wrong. Maybe that is what is wrong with the entire procurement procedures.

INCREASING COMPETITION

On February 24 of this year, Secretary Weinberger stated, "We now have an aggressive effort to increase competition. In July 1981, the DOD components were requested to develop objectives to increase competition." What specific objectives have the individual military departments and defense agencies established to increase competitive procurements? How will these objectives be achieved?

Mr. LONG. The military departments have each appointed what is called an advocate for competition whose role it is to work the competitive process within his service. The services have been charged to develop their individual goals for competition in terms of dollars and percentage of procurement. Data show from 1980 to 1981 there was almost a 4 percent increase in competitive procurement.

As you know, procurements that we are engaging in currently have some very large items, like nuclear carriers, which are not susceptible to competition. So I don't know whether this upward trend will continue.

We all recognize the benefits of competition, and we are committed to improving the competitive process. The process is effective not because it simply grinds down profit margins, which it doesn't necessarily do and shouldn't do, but it does bring out the best in

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creativity and attracts the best people. So we are committed to obtaining the maximum benefits of competition possible.

Mr. ADDABBO. Mr. Long, I sat for many years, and still am a member of, the Small Business Committee. We have had DOD representatives before that committee many times. Each year we try to press DOD into greater competition by utilizing small business competition. We have proven that where they have been pushed into that field, prices have come down. You tell me that you have given this directive to the military which means again the military is off doing their thing. Past experience has always proven the military takes the course of least resistance and does business as usual.

We just had several instances in the small business field where several military installations, which were competing small contracts for various services on base suddenly destroyed competition by giving a contract out as an umbrella contract rather than having competition among the small business people. I have taken that matter up with the Secretary's office and he found what we stated to be true. I believe a directive is going to reverse that.

So how can you tell me that you give a directive to the military and they are going to do it, and we see exactly the opposite? What do you do to monitor the military?

Mr. LONG. We get a continuous flow of information on awards in the procurement data collection system, based on the DD Form 350, with which you and your staff are familiar. It indicates on a contract by contract basis the nature of the procurement and a number of factors relating to it, including whether it is competitive, or some other category. That information is processed on a relatively current basis. We do have the data available to us to work with the Services. The system is one of our principal means to measure DOD component performance as related to our policies governing contracting. Thus it is just not a matter of requesting an advocate be appointed and goals set and then on to other things.

SECOND SOURCE—M-1 TANK FIRE CONTROL COMPONENTS

Mr. ADDABBO. Goals and numbers and figures have been worked out a thousand times. What is being done to make sure that these things are done? I have just given you an instance.

Let me give you another major instance. Those were maybe a small, $10, $20 million matter. But we now find that the Army had budgeted $83.4 million in fiscal year 1983 to establish a competitive second source for the M-1 tank fire control components. Experience showed with similar components for the M-60A3, through competition, there was a savings of 45 percent.

We now find out the Army has abandoned its plans for early competition and intends to enter a three year sole source contract instead.

Is that going backward or forward?

Mr. LONG. I can't tell you whether it is backward or forward.

Mr. ADDABBO. Mr. Little has.

Mr. LONG. Yes, what is the justification document? I would ask Mr. Little to comment on that.

Mr. LITTLE. Mr. Chairman, I believe you have jumped the gun. We do have a very good proposal. We also have a very good proposal from the second source. They are both still under evaluation. So no decision has been made.

Mr. ADDABBO. You are still evaluating it, no decision has been made?

Mr. LITTLE. That is right.

Mr. ADDABBO. Mr. Willson?

Mr. WILLSON. Mr. Little, is it not true the Army offered up the $83 million in the so-called hit list for the second source?

Mr. LITTLE. I don't understand.

Mr. WILLSON. The hit list which was supplied to the Senate Armed Services Committee by the Secretary of Defense, on the basis of suggestions from the services, included a reduction for the second source for the M-1 fire control components.

Mr. LITTLE. I am not familiar with that.

Mr. WILLSON. That would indicate a decision has already been made. In fact, it is our understanding a decision has been made.

Mr. MILLER. We did not offer the hit list from the Army. The $200 million was not offered by the Army. It was a $200 million cut. And I can only say the impact would be—probably would be the loss of the $80 million for second source if that $200 million stands.

Mr. EDWARDS. You are saying that was a Weinberger cut, not an Army cut?

Mr. MILLER. Yes, sir.

Mr. ADDABBO. The Secretary did not consult the military?

Mr. MILLER. I cannot answer that, sir, at my level. I can only say it was a top-down cut. I am sure there was consultation, but to say the Army offered it would be wrong.

Mr. ADDABBO. The Secretary said the hit list which we obtained, which he is not confirming nor denying, was put together by the military not by him.

COMPETITION IN WEAPON SYSTEMS

Also, we look at that same list and we find that the 1983 funds earmarked for establishing a second source for the HARM production has now also been proposed to be removed. Does this mean, Mr. Long, we are pushing competition or the military wants to do business as usual to continue sole-source?

Mr. LONG. I can only tell you that there is a strong emphasis and understanding as to the benefits of competition. The individual decisions, particularly on the major weapons systems and the sophisticated components of the major weapons systems, are complex and involve things such as the payoff on the substantial front end investment that a second source takes, and the effect on the schedule, either positive or negative.

I will be pleased to submit for the record the rationale for these decisions, but I don't think that it is reflective in any way, assuming the decisions were to not compete, that these decisions reflect any lessening of the emphasis on competition generally.

[The information follows:]

Competition in the weapons acquisition process occurs at many levels of which the production control decision is only one example. Modernization of military hardware competes with operating and support costs for the resources on the total defense budget. The advancement of the technology base and maintenance of the mobilization base compete with system acquisitions for that portion of the budget which is allocated to modernization. At the inception of an acquisition program, design concepts are competed to select the most promising approaches within our affordability constraints. Finally, we get to the production phase of an individual system acquisition program where it still competes with other production programs. Our prioritization, whether in R&D or in production, must be responsive to the political objectives of the nation. Uncertainty and changing priorities can have a significant destabilization effect on a program which may take ten years from design competition to production.

Recognizing this inherent instability, we are nevertheless emphasizing the development of an acquisition strategy from the inception of an acquisition program. The determination of whether or when to initiate price competition (as opposed to design competition) is influenced by the total quantity of end items to be acquired, the rate at which we can afford to buy them, and the incremental cost of the facilities necessary to put a second source into production. For example, if an end item is to be acquired from a sector in industry which is operating substantially below capacity and if the end item can be produced with existing facilities, the incremental cost of a second source may be quite small. Conversely, the cost can be substantial if new investment in expensive tooling, production machinery, and processes is required for the second source. In some cases, the potential savings from competition as well as alternative strategies (such as component breakout) have to be considered. Most importantly, once a particular strategy is selected, it cannot be changed easily without incurring penalties in the form of uneconomical production rates, schedule slips, sole sources of supply, and inefficiencies resulting from the use of obsolete production facilities and processes.

Competition is inherent in the acquisition process. We are committed to the use of competition to ensure fair and reasonable prices for our military hardware. However, we must also ensure that what we buy is responsive to our needs. To achieve a reasonable balance is our objective. There will always be some instances one could point to where a suboptimization on price competition was not achieved. Such instances should not be misinterpreted as either a lack of commitment or a failure to adhere to a policy.

SOLE SOURCE CONTRACTS

Mr. ADDABBO. Do you review sole-source contracts? As we look at the record, we find at Eglin Air Force Base, the same contractor has had the contract to operate and maintain that base since 1958. We find other cases, contracts existing for the Ballistic Missile Defense System at Huntsville since 1971.

Do you review these contracts? Our Surveys and Investigations team—and we gave you this report last year, show that of all the procurements, only 11 percent is competed, 89 percent is direct, almost sole-source. Are these old contracts reviewed?

General CONNOLLY. May I answer the one on Eglin? That contract is reviewed periodically. It is my understanding, and I will verify this for the record, it is going to be competed this year.

[The information follows:]

The Eglin Air Force Base Operations and Maintenance contract has been reviewed for possible competition at the Air Force Secretarial level 3 times in the last ten years. This year the Air Force Systems Command Headquarters determined that competition was desirable and feasible.

Competition was begun on March 10, 1982. Final negotiations are underway and a competitive award is expected to be made by October 1, 1982.

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SERVICES CONTRACT ACT

General CONNOLLY. One of the problems we have with service contracts is the Services Contract Act. Most of the contract is labor; and we have to pay the prevailing wage that is determined by the Department of Labor. There is really no advantage to competing if the successor contractor has to pay the same wage rates as the incumbent.

The only way you can save through a competitive process is to try to cut down the number of people, maybe management, cut down some overhead; but it is really not a large saving like 25 percent or 45 percent. That is one of the problems that we have.

Mr. ADDABBO. Except I can prove to you at John F. Kennedy Airport up in New York, Allied Maintenance has maintained its contract on some of those airlines for many years. Suddenly, airlines started to compete. Others came in with much lower prices. Somebody can get locked in and people are added on, seniority, other benefits are locked in. Some new people can come in and bring those prices down. Maybe we should be looking at that.

General CONNOLLY. We look at them periodically.

Mr. ADDABBO. I don't know how periodically. We are talking about 1958. Now you are looking at it in 1982. That is a real period; 24 years. Every quarter of a century we review it.

General CONNOLLY. It has been looked at and we decided we would not compete it. If you look at the record of all the other ranges that we have, you will see like the range at Patrick, the range at Vandenberg, Arnold Engineering Development Center, that the O and M contracts have all been competed. We try not to compete too many in any one year because of the burden it places upon that particular industry. Our policy is to compete the ranges. Eglin will be competed.

Mr. ADDABBO. Mr. Long, are you going to look into these questions of second source funds? You mentioned the probability or possibility of the fund being deleted because we are now looking at multi-year. I would also ask you to look at that very carefully because past experience has shown that in multi-year, we usually end up with maybe a 7 to 11 percent savings; and as I stated earlier on the M-60A3, when we competed that fire control system, there was a 45 percent savings. So maybe multiyear is not the best answer and second source competition will be a better answer to this problem.

The gentleman from Alabama.

BUYING IN A CONTRACT

Mr. EDWARDS. Initiative No. 6 in the Carlucci initiatives is "Budget To Most Likely Cost." The study panel's recommendation, to the Deputy Secretary of Defense, stated as follows regarding this issue: "Program costs are sometimes purposely understated to fit available funding rather than the funding it takes to do the job."

This practice is referred to as a "buy in."

To what, if any extent will the Carlucci initiatives correct or uncover the practice of "buying in" a contract at a low price?

Mr. LONG. Nothing is an immediate cure to that problem. That is a problem that we have faced as a Department and a nation for many, many years.

Mr. EDWARDS. True.

Mr. LONG. I believe there are specific instances in the 1983 budget where we have increased the budgeted amount simply because we felt that the amount that goes through from the prior POM was unrealistic. We are doing this by use of independent cost estimates and other devices.

That is not immediately the "buy-in" problem. The "buy-in" problem must be dealt with institutionally because no single program manager, be it a Department, a defense program manager or an industry program manager, is going to individually change that process. It is going to have to change culturally throughout the institution.

I will not sit here and tell you that we will have that problem licked by the end of 1982 or by the end of 1983. We are trying, through more sophisticated costing, to come up with reasonable estimates given a system baseline at a particular time, even recognizing that that system baseline may change.

We are trying to come to grips with how to crank into the source selection or proposal evaluation process a "penalty" for a bid or proposal that, in our judgement, is unrealistically low. This is a complex problem. It is going to take a long time to resolve this problem, but steps are being taken.

"SHOULD COST" ESTIMATING

Mr. EDWARDS. Is there a greater effort being put on "should cost" estimating?

Mr. LONG. Should cost and design to cost are specifically elements of this program. Greater emphasis is being put on both of them.

Mr. EDWARDS. Mr. Gordon, do you want to comment on that?

Mr. GORDON. Yes, I would like to clarify something. "Should cost" is a technique where, if you are already in production, you conduct an intensive audit of the contractor's methodologies and practices to determine not what has been his actual cost experience but what he should experience were he reasonably efficient. You utilize this information to assist the negotiator in negotiating a fair and reasonable price predicated on an inducement for the contractor to reform or change his methodologies so that he is producing in a way that he should be, rather than a way that reflects historical experience.

That is really unrelated to the question of cost realism or cost estimating. The problem of cost realism or cost estimating is the parametric and historical techniques that you use to determine what something will cost for which you have no really relevant cost experience. It is an art that has to be determined on a case by case basis.

For each major system source selection, there are several estimates which are used. The project office has an independent cost estimate which is generic. The contractor has a proposed price. There is an audit recommendation. There is a negotiated price. There is a best and final offer. Then there is the government's estimate of the most probable cost which for each and every offeror says, "given his design, his wage rates, his burden rates, this is what we think it will actually cost him, notwithstanding what he says."

We predicate our source selections on the government's most probable estimated cost and not on what he proposed. This sometimes causes us to award to other than the lowest priced offeror, because we look at cost realism. In addition to which there is an independent cost estimator, unrelated to the procuring activity.

So there are many, many cuts at this. In my experience, most "buy-ins" have resulted, not from intentional underbidding, but from technical optimism.

Mr. EDWARDS. I think of us sitting on this side of the table have probably been put in a position once in a while when we have had a low bidder come to us and say Joe, go to the GAO with me, these guys have done me in. I am the low and they have given it to the next low. What you are saying to me is that in many—in most cases—you have awarded to somebody other than the low because in your view it can't simply be carried out at the price they bid?

Mr. GORDON. Yes, for two reasons. Most of our larger contracts are not firm fixed price. Therefore, the proposed price does not necessarily reflect the price that the government will pay. What we look at is not the target price but the most probable price, in our opinion, for him to perform. That could mean that you have to look

at ceilings and share lines to determine who really is the lowest priced offeror.

If you factor in life cycle costs, then acquisition price may be relatively unimportant. So what I am saying is that other than in a firm fixed price contract, unless we feel he will lose money to the extent that will endanger his continued viability, we really rely upon our efforts to achieve cost realism in deciding the best buy for the government.

Mr. EDWARDS. Do you get overruled very often by GAO?

Mr. GORDON. No, sir.

Mr. EDWARDS. In the circumstances we are talking about.

Mr. GORDON. No, sir, but we do have a terrible time sometimes explaining this to the constituent or Congressman, who says ""I find it difficult to understand why you presume to know more about this than General Electric or Raytheon, et cetera. They said they could build it for less."

Mr. EDWARDS. You know that I wouldn't say a thing like that to you, but I can tell you in all honesty, in 18 years I don't think GAO has ever ruled with my constituent in this kind of a case which suggests to me that you guys have either done a good job, A; or B, you have GAO fooled. I think that is hard to do.

Well, you have given us sort of a textbook definition. I use the term "should cost" and I think you properly got me back on the track where "should cost" is, in fact, used. Budgeting to "most likely cost" is in the initial stage of budgeting?

Mr. GORDON. Yes, sir. We obligate the contract target price. We budget to most probable cost or most likely cost.

INFLATION ASSUMPTIONS

Mr. EDWARDS. What assumptions are made by OSD in determining estimates for inflation rates in the outyears? Do you use OMB's assumptions? Do you use Pentagon assumptions?

Mr. LONG. When we are talking about individual programs, we use the actuals for the years covered by those contracts. When we are applying inflation to programs as opposed to forward pricing for contract purposes, we have historically used the OMB deflator or inflation rate.

In discussions and negotiations with OMB last year, we reached agreement with OMB that for certain major classes e.g., aircraft, ships, etc. that we would use more commodity based indices. I think that the actual commodity based indices that we are using vary from the OMB deflator or inflation rate by one or two percentage points.

Mr. EDWARDS. I hear that in the defense industry, the inflation rate tends to be almost double what the commercial or the non-defense industry inflation rate is. Is there any basis for that?

Mr. LONG. I think there is substantial basis for the proposition that—particularly in times of higher inflation—the military commodities suffer an inflation rate higher than the country as a whole. I have not seen any data that would support a doubling of the rate, but I have seen data that would say it is 20 or 30 percent higher.

Mr. EDWARDS. Can you put a reason on that?

Mr. LONG. Some of the materials that we use are scarcer and as the economy generally suffers a squeeze and a price spiral, the scarcer the commodities in relation to demand, the greater the inflation rate. The same is true with skilled labor. As we are in a period of increasing wages, it seems historically that the shorter the supply of a particular skill, the quicker or the greater percentage the skilled laborer possessing that particular skill can get his labor rates up.

Mr. EDWARDS. I guess the implication is when this subject is discussed that somehow the defense contractor tends to rip off the Pentagon or the taxpayer or somebody by running his price up higher than would be considered appropriate. Have you found that—can you comment on that?

Mr. LONG. As I said earlier this morning, we in many instances are a cost-based buyer, since we are the market. To the extent that we are doing the job we should, in reviewing cost proposals, in auditing them, in tracking contractor's cost, he isn't simply raising his price because things are in short supply. As you go down the pipeline to the lower levels of suppliers, there could perhaps be some of that because there is a law of supply and demand down in the lower levels of the system where we are not cost pricing; at least we are not the buyers. There is a market down there—the supply and demand forces—which are at play. It may be in some instances there is a price based on what the market will bear' effect. I can't say there isn't. There very likely is.

COST INCREASES REPORTED UNDER NUNN AMENDMENT

Mr. EDWARDS. We have seen a long list of cost overruns reported under the Nunn Amendment. The latest Selected Acquisition Report shows additional non-inflation cost growth for a number of systems, including Copperhead; $245 million; Patriot, $428.4 million; and HARM, $121.7 million. Apparently, "budgeting to most likely cost" has not stemmed the rising tide of cost overruns.

Can you comment on the rising tide of cost overruns, therefore?

Mr. LONG. I can certainly supply for the record our analysis of the Nunn reports which we filed. A number of the increases—and we are talking only non-inflation type increases—are related to increases in quantities in the outyears which is in itself sort of an inflationary impact. I just will have to look into the reports for each of those programs and give you an analysis.

[The information follows:]

The weapon systems which breached the Nunn Amendment thresholds are shown below. The Procurement Unit Cost (PUC) is defined as the fiscal year 1982 procurement TOA divided by the fiscal year 1982 procurement quantity. The Program Acquisition Unit Cost (PAUC) is defined as the total program RDT&E, procurement, and construction costs divided by the total program quantity.

ARMY

1. Roland (Fire Units)

a. Program Acquisition Unit Cost: (1) Baseline; $18.1 million; (2) Current Estimate, $43.9 million; and (3) percent over, 143.0.

b. Reason: Program is being cancelled. However, development and initial procurement costs have already been incurred. These sunk costs, along with additional termination costs are amortized over the reduced quantity now being procured.

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2. Patriot (Fire Units)

a. Program Acquisition Unit Cost: (1) Baseline; $78.4 million; (2) Current Estimate, $105.0 million; and (3) percent over, 34.0.

b. Reason: The increase was due to increased quantity of launchers and associated inflation in the outyears, increased outyear engineering, a revised maintenance concept, and more pragmatic funding profiles for fiscal year 1982 and fiscal year 1983.

3. Pershing II (Battery Equivalent)

a. Program Unit Cost: (1) Baseline; $46.7 million; (2) Current Estimate, $60.4 million; and (3) percent over, 29.5.

b. Program Acquisition Unit Cost: (1) Baseline; $107.6 million; (2) Current Estimate, $168.7 million; and (3) percent over, 56.8.

c. Reason: Changes are due to underestimation of the complexity of manufacturing the system, extension of procurement schedule, engineering changes, changes in cost accounting standards, and differences between official OMB inflation indices and actual inflation.

4. AH-64

a. Program Unit Cost: (1) Baseline; $33.1 million; (2) Current Estimate, $49.5 million; and (3) percent over, 48.0.

b. Program Acquisition Unit Cost: (1) Baseline; $10.9 million; (2) Current Estimate, $16.2 million; and (3) percent over, 49.0.

c. Reasons: PUC—Increases were due to hardware and labor costs to implement changes resulting from design to cost reviews, increased tooling costs, and upgrading of automatic test equipment.

PAUC—Increases were due to actual inflation exceeding OMB indices, increased requirements for spares, increased recurring hardware costs, increased maintenance training hardware, and increased tooling costs.

5. Hellfire

a. Program Unit Cost: (1) Baseline; $121.0 thousand; (2) Current, $178.1 thousand; and (3) percent over, 47.2.

b. Reason: This unit cost growth in primarily attributed to a reduction of fiscal year 1982 procurement funds. The Army chose to reduce the number of missiles to be procured in fiscal year 1982 while fully funding production facilities.

NAVY

1. SSN-688

a. Program Unit Cost: (1) Baseline; $698.3 million; (2) Current Estimate, $816.3 million; and (3) percent over, 16.9.

b. Program Acquisition Unit Cost: (1) Baseline; $331.073 million; (2) Current Estimate, $433.323 million; and (3) percent over, 30.9.

c. Reasons: PUC—Additional advance procurement funding and extended fiscal year 1977 funds were authorized by Congress.

PAUC—The increase is due to the inflation impact of 12 additional ships in the outyears and addition of the Vertical launch System.

2. FFG-7

a. Program Acquisition Unit Cost: (1) Baseline; $202.392 million; (2) Current Estimate, $237.428 million; and (3) percent over, 17.3.

b. Reason: The increase is primarily due to the inflation costs for 9 additional ships in the outyears plus combat upgrades for these ships (constant dollar change is 3.34 percent).

3. F-14

a. Program Acquisition Unit Cost: (1) Baseline; $23.684 million; (2) Current Estimate, $42.405 million; and (3) percent over, 79.0.

b. Reason: The increase is due to addition of 336 aircraft in the outyears, related inflation, and an improved radar (constant dollar change −1.9 percent).

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4. Phoenix

a. Program Acquisition Unit Cost: (1) Baseline, $0.714 million; (2) Current Estimate, $0.848 million; and (3) Percent Over, 18.8.
b. Reason: This increase is due primarily to the inflation impact of the additional 1,302 missiles in the outyears (constant dollar change is −11.7 percent).

5. AIM-7M

a. Program Unit Cost: (1) Baseline, $0.158 million; (2) Current Estimate, $0.228 million; and (3) Percent Over, 44.3.
b. Program Acquisition Unit Cost: (1) Baseline, $0.141 million; (2) Current Estimate, $0.186 million; and (3) Percent Over, 31.9.
c. Reason: PUC—This increase is due to a congressional cut of 320 missiles.
PAUC—This increase is due primarily to increased estimates for missiles produced in fiscal year 1981 and beyond. Former estimates were based on AIM-7 cost experience.

6. Sidewinder

a. Program Unit Cost: (1) Baseline, $0.055 million; (2) Current Estimate, $0.074 million; and (3) Percent Over, 34.6.
b. Reason: This increase is due to a procurement deferral of 210 missiles until fiscal year 1983.

7. Trident Missile

a. Program Acquisition Unit Cost: (1) Baseline, $17.855 million; (2) Current Estimate, $24.332 million; and (3) Percent Over, 36.3.
b. Reason: This increase is due to a reduction of 309 missiles.

8. 5-Inch Guided Projectile

a. Program Acquisition Unit Cost: (1) Baseline, $0.041 million; (2) Current Estimate, $0.949 million; and (3) Percent Over, 2214.6.
b. Reason: Program is cancelled. Sunk costs must be divided over 141 prototype rounds.

Air Force

1. F-15

a. Program Acquisition Unit Cost: (1) Baseline, $19.59 million; (2) Current Estimate, $28.66 million; and (3) Percent Over, 46.3.
b. Reason: The inflation impact of the addition of significant quantities in the outyears.

2. F-16

a. Program Acquisition Unit Cost: (1) Baseline, $14.53 million; (2) Current Estimate, $20.48 million; and (3) Percent Over, 40.9.
b. Reason: This increase is due primarily to the development and procurement costs for additional aircraft and support equipment. This includes aircraft in the fiscal year 1986-1991 period.

3. A-10

a. Program Unit Cost: (1) Baseline, $9.18 million; (2) Current Estimate, $11.80 million; and (3) Percent Over, 28.5.
b. Reason: The fiscal year 1982 aircraft production quantity reduced from 60 to 20.

4. AIM-7M

a. Program Unit Cost: (1) Baseline, $0.153 million; (2) Current Estimate, $0.217 million; and (3) Percent Over, 41.8.
b. Program Acquisition Unit Cost: (1) Baseline, $0.128 million; (2) Current Estimate, $0.160 million; and (3) Percent Over, 25.0.
c. Reason: The increase was due to higher than expected proposals by both contractors, increased material and labor costs, inflation greater than OMB indices, and congressional budget cuts resulting in quantity reductions.

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5. Maverick

a. Program Acquisition Unit Cost: (1) Baseline, $0.068 million; (2) Current Estimate, $0.079 million; and (3) Percent Over, 16.2.

b. Reason: The increase is due to (1) changes in guidance section estimates, (2) revised inflation estimates, and (3) engineering design changes.

6. DSCS III

a. Program Acquisition Unit Cost: (1) Baseline, $83.5 million; (2) Current Estimate, $137.0 million; and (3) Percent Over, 64.1.

b. Reason: The cost increase is due primarily to increases in the estimate of labor, materials, and associated inflation.

Mr. EDWARDS. I will put some other questions in the record at this point.

[CLERK'S NOTE.—Questions submitted by Mr. Edwards and the answers thereto follow:]

Question. Which systems which have received additional funds for "most likely costs" have been reported under the Nunn Amendment?

Answer. Patriot, Pershing II, AH-64, F-14, Phoenix, AIM-7M, F-15 and F-16.

Question. Which systems have shown non-inflationary program cost growth in the March SAR, and why?

Answer. The SAR systems which showed non-inflationary program cost growth for the quarter ending March 31, 1982 are shown below. Of the forty two major acquisitions, ten systems identified cost increases for reasons other than the application of higher anticipated inflation rates.

1. PATRIOT. Program costs increased $603.0 million, from $10,709.2 million to $11,312.2 million, due to an adjustment to the application of the January 1982 escalation indices (+$174.6 million), rescheduling of the launchers/missiles to agree with the FYDP production schedule (+$24.8 million), a new fuze processor, expanded memory in the weapons control computer and a land navigation/heading reference unit for emplacement enhancement (+$71.2 million), and a revision to the hardware cost estimate (+$332.4 million).

2. ROLAND. Program costs increased by $1 million, from $1360.8 million to $1361.8 million, due to reinstatement of appropriated funds previously reprogrammed out of the ROLAND program.

3. COPPERHEAD (CLGP). Program costs increased $245.1 million, from $1,364.0 million to $1,609.1 million due primarily to increased cost estimates based upon the contractor's latest proposal.

4. MLRS. Program costs increased by $2.2 million, from $4,137.1 million to $4,139.3 million, due to a reestimate of the program to account for the impact of a contractor strike.

5. F-14A. Program costs increased by $4.1 million, from $35,832.3 million to $35,836.4 million due to the reestimate of fiscal year 1980 and prior contracts which were defined at lower prices ($−1.1 million) and the reestimate of the AWM-23 based on contract definition (+$5.2 million).

6. F-16. Program costs increased $1,385.6 million, from $40,904.0 million, to $42,289.6 million, due to an increase in the fiscal year 1981 escalation rate used in the December 1981 SAR (+$1,326.2 million), a reschedule of prior year effort (+$346.4 million), an ad-

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justment for prior year escalation (−$274.2M), and a reestimate of support costs (−$12.8 million).

7. Harm. Program costs increase $253.5 million from $3,941 million to $4,194.6 million, due to an increase in the fiscal year 1981 escalation rate used in the December 1981 SAR (+$131.8 million), and a reestimate of the program out-year (fiscal year 1988–1992) cost (+$121.7 million).

8. DSCS III. Program cost increased $147.1 million, from $1,718.7 million to $1,865.8 million due to an increase in the fiscal year 1981 escalation rate used in the December 1981 SAR (+$38.9 million), a revised estimate of the program cost and an adjustment for Prior Year Escalation (+$100.6 million), and integration of a 10-watt Solid-State Amplifier into the Satellite (+$7.6 million).

9. ALCM. Program costs increased $242.3 million, from $8,071.9 million to $8,314.2 million, due to an increase in fiscal year 1981 escalation rate used in the December 1981 SAR (+$253.4 million), a shift in schedule for depot development efforts and support equipment procurement (+$83.5 million), and adjustments for prior year escalation (−$94.6 million).

10. GLCM. Program costs increased $107.9 million, from $3,307.3 million to $3,415.2 million, due to an increase in the fiscal 1981 escalation rates used in the December 1981 SAR (+$99.9 million) and rephasing of the Transporter Erector Launcher and Launch Control Center procurements (+$8.0 million).

Question. What systems are expected to receive additional funding in fiscal year 1984 under this initiative?

Answer. It is too early in the budget cycle to anticipate which programs will receive additional funding. However, the Services and OSD will review each program on a case by case basis to determine which programs require additional funding to ensure budgeting to "most likely cost."

Question. When might we see a turnaround in program cost growth as a result of the Carlucci initiatives?

Answer. The effects of the Carlucci initiatives on program cost growth will be in the form of cost avoidance over the total acquisition cycle. The results of cost avoidance should become evident as actual costs are recorded and compared to the baseline estimates. In most cases, it will take several years before a meaningful measurement can be made.

[CLERK'S NOTE.—End of questions submitted by Mr. Edwards.]

Mr. EDWARDS. If you will respond to all of that?

Mr. LONG. I will be happy to.

Mr. EDWARDS. Thank you, Mr. Chairman.

Mr. ADDABBO. The gentleman from Pennsylvania, Mr. Murtha?

ACQUISITION ECONOMICS AND EFFICIENCIES

Mr. MURTHA. Let me ask you about acquisition economies and efficiencies.

When the President's budget was submitted in early February, the Congress was given a list of economies and efficiencies which the Department of Defense included in the budget. These actions were said to yield savings amounting to $51.4 billion between fiscal years 1981 and 1987. $13.8 billion of the savings, including $2.4 bil-

lion in fiscal year 1983, resulted in economies and efficiencies in procurement programs.

On March 29, 1982, a revised list was submitted. Numerous claimed savings on the original list were deleted. Other savings were increased and new savings were added.

Procurement savings were increased from $13.8 billion to $16.0 billion.

Why were these changes made?

Mr. LONG. You referred to a page number, Mr. Congressman. I don't think we have the same piece of paper.

Mr. MURTHA. This is page 34 of our questions. It is acquisition economies and efficiencies. That is the title. Staff says you should have had the questions——

Mr. LONG. We got them midday yesterday. They are in a different format, so our page numbers don't correlate. I am looking for it because you read it so quickly I had a hard time getting the sense of it.

Without having the specific data with reference to the $13.8 billion change, I believe that resulted from a reanalysis of some of the multiyear procurement programs and the addition of some programs, I am not certain of that. I will have to verify that for the record.

With respect to why some savings were deleted in March of 1982, we were nearing the end of the first year of the program. For some of the analyses that we had undertaken in connection with various initiatives, it was the first time through for these kinds of analyses. Perhaps we did it too quickly. Perhaps we made some analytical errors. I suspect if we went back again today and analyzed these same things, there would still be further changes. These are not matters susceptible of precise numerical determination.

I will look into this matter in more detail and supplement it for the record.

[The information follows:]

The changes were made to correct errors which had been included in the previous economies and efficiencies list.

Approximately $1.0 billion of the deleted items represented actions which had been initiated prior to 1981, which could not be claimed as management initiatives of this administration or items where only gross savings estimates were presented and where it was impossible to calculate net savings.

The additional procurement savings of over $2 billion were primarily associated with the inclusion of the savings from 18 programs or systems which were either eliminated or reduced during the reporting period but which were not included in the previous economies and efficiencies list.

Mr. MURTHA. I wish you could answer these questions for the record. They are good questions. What I am concerned about is changing the figures just to fit the budget. I have a great concern about the tax delay, as I mentioned earlier, and the fact that we have the ten percent tax cut coming up.

It looks like to me it is going to come right out of defense this year. We are going to have real problems meeting some of what I consider serious deficiencies because of my disagreement—the Administration obviously doesn't agree with me, but—we have to find money to pay for defense.

We haven't done it for years. We have had deficiencies over the years. I just hope we are not manipulating figures rather than making the actual changes.

I wish you would answer the following questions for the record.

[CLERKS NOTE.—Questions submitted by Mr. Murtha and the answers thereto follow:]

Question. On April 30, GAO reported that "DoD even now, continues to refine its earlier savings projections and to examine other initiatives and programs for additional savings." Will there be additional changes proposed? When might we expect to see them?

Answer. The economies and efficiencies program is a dynamic and continuing effort within the Department of Defense. New initiatives and programs for additional savings will continue to be developed and implemented. Further lists of economies and efficiencies savings will incorporate these new initiatives as well as refining previous initiatives. Subsequent economies and efficiencies reports will be issued periodically. Most probably in conjunction with program or budget submissions since they represent the management initiatives embodied in those documents.

Question. What changes should be made to the fiscal year 1983 budget since 16 items were eliminated and 47 items were revised?

Answer. None. The elimination or revision of items on the economies and efficiencies list of savings has no impact on the fiscal year 1983 budget. The list reflects savings from items already incorporated in the budget or in the outyears. Changes in the management initiatives embodied in the budget would change the list but not vice versa.

Question. GAO's review of the economies and efficiencies concluded that no system had been established within OSD to track the claimed savings.

Do you intend to establish such a system?

Answer. We do not intend to establish a new system for tracking the savings orginating from economies and efficiencies initiatives. As previously noted a major portion of the economies and efficiencies savings within DoD are derived from management actions relative to weapon/support systems and other acquisition programs. For these acquisition programs we already have adequate systems in place for determining that planned management actions do occur and that the savings are in fact achieved.

Question. If not, how will we ever know if the claimed savings were achieved?

Answer. With regard to acquisition programs the current reporting systems are adequate for determining that planned management initiatives are implemented and the associated savings are achieved.

In the area of operations, as noted by the GAO, it would require a new and extensive reporting system to track the detailed dollar savings associated with all of the particular management actions contained in the economies and efficiencies report. Such a system would also run the danger of focusing our attention on the calculation of exact dollar values to the possible detriment of the development and implementation of effective management actions to reduce costs and improve performance.

The procedure for items such as those in the area of operations will be to evaluate the reasonableness of their estimated savings and then insure that the particular management action does in fact occur. This procedure will insure that the relative savings are in fact achieved. Current reporting systems are adequate to insure that claimed management initiatives are in fact being implemented.

[CLERK'S NOTE.—End of questions submitted by Mr. Murtha.]

Mr. MURTHA. A total of $372.9 million in savings was projected to result from ammunition acquisition efficiencies.

On March 17, the committee received testimony from the Army that these savings could not be achieved.

Why did the March 29th revision to the economies and efficiencies list fail to reflect the fact that these savings could not be achieved?

Mr. LONG. I will have to share the response to this with Mr. Little. I don't have at my fingertips the details on this particular matter.

[The information follows:]

Although the Army testified on March 17, 1982, that it does not now anticipate this level of savings, OSD and the Army have been discussing viable alternatives to achieve these savings. We do consider these savings achievable.

Mr. MURTHA. Please answer the following questions for the record.

[CLERK'S NOTE.—Questions submitted by Mr. Murtha and the answers thereto follow:]

Question. The Surveys and Investigations Staff reviewed a random sample of 16 items with savings totalling $2.1 billion. They concluded that only $152 million were valid reductions and capable of being realized as savings in the year claimed. Savings of $807 million were either improperly claimed, overstated, or not clearly achievable. Savings of $1.1 billion related to misleading claims based on multiyear contracting or economic production rates.

The issues raised by this S&I review bring into question the validity of your entire economies and efficiencies package. How carefully were the claimed savings reviewed by the services which proposed them?

Answer. The individual services were responsible for insuring that their economies and efficiencies package were fully reviewed

and validated. Frankly, however, we did a less than perfect job of establishing clear and definitive ground rules for the package in advance and had a major administrative task in sorting out the valid items from the invalid ones in the time available.

Question. How carefully were they reviewed by the Office of the Secretary of Defense and which specific offices participated in that review?

Answer. The Office of the Deputy Assistant Secretary of Defense (Program/Budget) has primary responsibility for the preparation of the economies and efficiencies report. This office was responsible for coordinating the review of the economies and efficiencies items contained in the package with the appropriate OSD staff offices. Given the time available the office conducted as comprehensive and thorough a review as possible.

Question. The S&I staff did not review $6.9 billion in claimed savings from operations because supporting documentation was not available. What documentation was used to calculate these savings in the first place and why was it not available to the S&I staff?

Answer. The documentation format for items in the operations area was the same as that used for the acquisition area. This documentation was available for the S&I staff's review. However, compared to the acquisition items the tracking and validating of the operations data is extremely difficult and time consuming. This is due to the fact, as noted previously, that operations data is seldom identified to a separate line item. In order to track the data a new and extensive reporting sytem would have to be developed and implemented. This documentation was included in the Economies and Efficiencies Report of March 29, 1982 which was provided to Congress.

Question. Most of the savings claimed to be invalid by the S&I staff were not changed when your revised report was issued March 29. Would you please review their report and provide your comments for the record?

Answer. The following comments are keyed to the relevant sections of the S&I report.

E-3A Procurement and Production Plans

The Carter Administration submitted a budget with no E-3A aircraft in FY 1982. This was the official position of the executive Branch. Wheather or not the Carter Administration would have ultimately pursued that program if re-elected is not known. The current Administration chose not to pursue that program due to the cost growth occasioned by the production interruption. it appears the contractor chose not to enter into an extensive repricing exercise based on his own estimate of what the next Administration would do.

E-3A Procurement of Radar as GFE

Subsequent to the promulation of the 29 March Economies and Efficiencies Report, the Department has deferred break-out of the E-3A radar to a subsequent year when the Air Force will have negotiated an assignment clause with the prime contractor and more

definitive cost and manpower data is available to ascertain the potential savings.

E-3A Procurement of Consoles as GFE

The Air Force did not erroneously compute the unit savings. In addition to the $1.4 million associated with break-out consoles installed in production aircraft there were savings of $1.4 million associated with break-out of additional consoles associated with an approved E-3A modification program.

E-4B Procurement Program Reduction

The SAC determination that the E-4B would not meet it's requirements was based on the SAC belief that an additional aircraft beyond those programed was required to meet the total mission requirement, not that the E-4B aircraft as configured would not meet the mission requirement. The S&I staff is correct in the assumption that the EC-135s will ultimately have to be replaced and EC-135s will continue to operate in lieu of E-4Bs. There is currently no approved program for the replacement of EC-135s and it should be noted that the Department claimed no O&S savings due to the termination of the last 2E-4s.

Multiyear Contract

The $246.0 million savings contained in the 2/8/82 E&E Report did not utilize the latest OSD inflation estimates. The savings reported by OSD in the 29 March, 1982 E&E Report were made on the basis of savings each year as a result of the multiyear contract. The SPO estimates savings (identical to the 29 March. 1982 OSD E&E Report in total) depicted net TOA changes each year, not the estimated savings each year. The $325.8 million savings claimed by General Dynamics were associated with their own estimate of inflation, not the OSD approved rates.

Forty five of the aircraft in the MYP are part of a previous multiyear contract between General Dynamics and its subcontractors wherein General Dynamics had negotiated a multiyear price with its subcontractors. General Dynamics has indicated that they will reexamine these contracts to see if they can be renegotiated to the extent additional savings can be achieved as a result of the multiyear. These 45 aircraft will, however enjoy savings associated with the mutiyear contract associated with General Dynamics overhead and subassembly and assembly of items furnished by these vendors.

The fact that the total F-16 program has increased by 597 aircraft with associated cost does not alter the fact that 480 aircraft included in the total program will cost $259.5 million less due to execution of the multiyear contract.

Items G-K (SH-60B, CH-53E, C-2A): Since the S&I report accepted the savings related to these initiatives no further comments are offered.

Items L-N (EA-6B, A-6E, F-14A): The S&I discussion of the reported economies and efficiencies in the procurement of these aircraft seem to be concerned with two issues. The first issue is the

requirement to increase TOA to obtain savings from more efficient production rates. The S&I staff implies that no savings exist because TOA had to be added to achieve the savings. This implication is misleading. It is true that near year TOA requirements increase when production rates are increased but unit cost and total program costs are decreased. The economy and efficiency report attempts to capture these total program cost decreases by showing the unit cost impacts in the applicable years.

The second concern revolves around the possibility that assumptions made in estimating multiyear procurement costs might not be borne out by experience. The Department uses its best judgement in estimating program costs. The Department considers the multiyear procurement economy estimates reasonable and realistic. If anything, experience is showing that our estimates were conservative and that even higher savings may be achieved.

Question. Savings of $26.7 million were claimed for acceleration of SH60B procurement and multiyear procurement of the A6E. These savings are now invalid because the programs have been placed on the so-called "hit list." If OSD is committed to economies and efficiencies why was the Navy allowed to propose reductions which invalidate potential savings?

Answer. Reductions which invalidate potential savings from a particular action or program do not reflect a lack of commitment to economies and efficiencies. Each economies and efficiencies action must be evaluated not only on its individual merits but also in relation to other items which also equire resources and with which it must compete for those resources. Many of the economies and efficiencies actions require increased expenditures in the budget years in order to generate savings in the cutyears. Given the fact that resources are limited a decision may be made to forego outyear savings in order to procure near term mission capabilities. The resources may also be applied to a project or action which will generate larger outyear savings for the same near term investment. In either case the diversion of resources from one particular management initiative to another represents a continued commitment to the economies and efficiencies program and the achievement of the maximum in savings consistent with mission responsibilities.

[CLERK'S NOTE.—End of questions submitted by Mr. Murtha.]

UNALLOWABLE CONTRACT EXPENDITURES

Mr. MURTHA. Unallowable contract expenditures, there's a list of items here of things contractors bought over the years and charged off as legal expenses for defense contracts. The committee asked what actions had been taken against these contractors.

The Department's reply was: "The Department of Defense has not taken action to disqualify any contractor from doing further business with DOD because unallowable costs were included in a proposal. Action taken was to disallow those costs."

Why was disqualification action not taken?

Mr. LONG. I have a hard time understanding the analytical basis for the question.

Contractor cost and prior proposals are based on data from the contractor's books and records. Most of the kinds of costs that you are talking about are contractor overhead costs. They are not the direct material and labor costs to perform the contract.

The contractors with which we do business have varying accounting systems of greater and lesser degrees of sophistication. I think our auditors, the Defense Contract Audit Agency (DCAA) will tell us and will tell you that the major contractors dealing in major weapons systems by and large do a very good job in handling the cost principles and cost allowability.

Why unallowable cost found in the negotiation or the audit process and therefore disallowed and not paid, should lead to debarment is a matter I just don't understand as an analytical question.

Mr. MURTHA. What action do you take?

Mr. LONG. We disallow the costs and don't pay them. We have a whole set of cost principles that says certain types of costs are not allowable under certain conditions.

Mr. MURTHA. You disallow those costs under the contract?

Mr. LONG. That is right. There are a lot of costs that fall into a gray area.

Mr. MURTHA. How do they list these in the contract itself? Do they send a list of what they consider allowable costs and you negotiate, or how does this come up?

Mr. LONG. No. For the larger contracts, the contractor submits the certified cost and pricing data on a DD form 633, which lists anticipated costs in gross on one page and identifies detailed backup to support these costs (labor, material, overhead, etc.). The overhead either comes from a negotiated overhead rate between the government and the contractor which applies to all contracts, or in some other fashion, but the proposal doesn't have the detail of all of the contractor's books and records.

We then use the audit process, our DCAA auditors, to go in and examine the contractor's books and records to determine whether the costs included are, number one, allocable, which is the first test. If a particular cost included in a proposal is not allocable to the government or to this contract, it is disallowed. If it is an allowable cost—advertising contingent fees, interest expense, etc. are not allowed—and allocable, the next determination is whether it is reasonable in amount.

We disallow costs because they are unallowable under the defense acquisition regulations or are not properly allocable to the contract. We also disallow costs to the extent that they are unreasonable even if, in generic terms, they are allowable and allocable. The process is designed to enable our negotiators to find out whether there are any unallowable costs, and, if so, to disallow them.

Since that is the process, I have a hard time understanding the analytical basis for a question which implies that we ought to debar somebody because the process works.

Mr. MURTHA. It does work?

Mr. LONG. It may not work a hundred percent, but it works by and large.

GOODWILL CHARGES

Mr. MURTHA. Apparently we are talking about a substantial amount of money. GAO reported the Armed Services Board of Contract Appeals has under consideration whether DOD will or will not permit defense contractors to charge contracts for goodwill.

I assume this is what those types of items would be.

Mr. LONG. No, that is a single type of cost in the question before the ASBCA. Whether that cost element in the contractor's overall costs is allowable.

Mr. MURTHA. What does goodwill consist of?

Mr. LONG. That is a case by case analysis. You can look at General Motors. It may or may not have goodwill on its books.

Mr. MURTHA. How do they write it off? You explained how they take things you consider nonallowable, but how do they take something like goodwill? Do they write it up as goodwill? Do they itemize it?

Mr. LONG. No, it is on their books as goodwill with whatever elements that make up that account on the company's books.

Normally a contractor's overhead is spread over his business, including his commercial business and his government business. To the extent that goodwill is allocated on some sort of factor such as sales or direct labor material, whatever the allocation factor is, that item would be allocated to all the contractor's business.

Mr. MURTHA. If he has an item on public television, you could consider this as goodwill, or is this advertising?

Mr. LONG. That would be advertising or public relations. If a company pays a premium in a tender offer, that premium may be goodwill or it could be they could include as goodwill a host of other items of expense wholly unrelated to this contract. The request before the ASBCA is, whether the goodwill is a legitimate cost of doing business?

It is not a question of whether it is a cost to perform this contract in the first instance. It is an overhead item for the contractor.

Mr. MURTHA. If they put goodwill in, do you dispute the amount? How do you pay something like this?

Mr. LONG. Right now we don't. Right now it is not an allowable cost. I believe the issue before the Board in this case is whether that is a cost that ought to be allowable.

Mr. MURTHA. Well, it is significant because, according to the information we have here, it amounts to about $3 billion a year. So it could be a significant cost. You say it is not allowable now?

Mr. LONG. It is not. That is the issue before the Board, and I have not examined the pleadings or the arguments in that case.

Mr. MURTHA. The other items are taken item by item? You just disallow them, is what it amounts to?

Mr. LONG. They are taken item by item, to the extent that they are in the backup; or to the extent that we audit the books of the contractor.

Let me comment, if I may, on the last part of this goodwill question. Has OSD expressed its concern to the ASBCA that it should not rule in favor of the contractor in this case? The answer to that is no.

The ASBCA was set up, although it is denominated in its legal charter as the representative of the Secretary, it is a neutral, quasi-judicial body and it would defeat the real purpose of the ASBCA if the Office of the Secretary of Defense were to inject itself into the process other than as either a litigant or an amicus.

To the extent there is an inference in here we ought to go down to the trial judges and counsel with them on how they should decide cases, that is not appropriate.

Mr. MURTHA. I can't argue with your comment on that. What concerns me is they could build in an item to the contract to add to the profit.

I assume that——

Mr. LONG. Let me mention one thing. To the extent we are talking about goodwill, it is goodwill that first of all has to be legitimately on the books of the contractor. If that case were decided in favor of the contractor, that would not mean that all other contractors could all of a sudden go out and create an account on their books labeled goodwill and charge it to the government.

It has to be there in a legitimate accounting transactional sense. Advertising for example may create goodwill in terms of customer desire and attitude. The cost of advertising, i.e., radio spots, magazine inserts, etc., are incurred advertising costs. That happens to be a cost that is not allowable. If that were to change, that wouldn't mean people could bogey up advertising costs and charge them to us.

It is actual accounting records we are talking about. Many of our contracts, as you know, are subject to the SEC accounting rules which have very strict requirements on goodwill. I don't say we do business with a lot of small contractors or contractors not subject to those accounting rules, but generally the accounting profession itself has fairly strict rules for goodwill. It is not something that will just be made up out of whole cloth.

Mr. MURTHAL. Please answer the following questions for the record.

[CLERK'S NOTE.—Questions submitted by Mr. Murtha and the answers thereto follow:]

UNALLOWABLE CONTRACTOR EXPENSES

Question. Are you saying that a contractor can repeatedly submit unallowable costs, hoping that some of them will slip past the auditors?

Answer. No. The question of whether a particular cost is allowable or unallowable is not always clear. Many times we are working in gray areas. For instance, when does the cost of a legitimate business meeting expense pass over the threshold and become entertainment expense or at what point do reasonable expenses reach a point where they are unreasonable? It is only natural for contractors to interpret our regulations in the most liberal manner and submit for all of these costs. It is our job to review these submissions and negotiate a reasonable level of acceptable cost. It is rare that a contractor will repeatedly submit requests for reimbursement of costs that are clearly unallowable.

Question. Are any records kept of attempts by contractors to charge for items which are the same or similar to items previously disallowed? If not, why? If so, should not such activity be grounds for disqualification?

Answer. We have not attempted to keep records at a higher level than the field offices. However, we have recently established an overhead monitoring activity in our office of Cost, Pricing and Finance. This office will be collecting data on negotiated overhead settlements. We will then have a basis for determining the appropriate action.

Question. GAO also reported that every year DCAA identifies millions of dollars in unsupported costs being submitted by defense contractors for payment. Frequently, contractors will produce documentation for unsupported costs during the negotiation process, but quite often the contracting officer is unqualified to evaluate the data. On March 19th, OSD answered a question on this matter by stating, "If the contracting officer believes the auditor should be present during negotiations, an invitation is extended. Often, consultations take place by phone." Do you believe this answer expresses the proper concern of OSD?

Answer. There is a misunderstanding on the subject of unsupported costs. The costs so identified by DCAA are not costs submitted for reimbursement. They are usually engineering estimates of anticipated future costs submitted by the contractors in connection with price proposals. However, because they are not based on projections made from historical data in the context of an audit evaluation they are considered unsupported. There are cases when DCAA has identified such historically unsupported estimates that contractors will at a later date and even at the time of the negotiation offer additional data in an attempt to further support the estimates. In those cases if the Government negotiator utilizes the data he will obtain audit assistance. However, in most cases the Government negotiator has already obtained an evaluation of the engineering estimates from our own technical personnel and the data submitted at the table is not used. In this context I believe that our previous answer expresses proper concern for the situation.

Question. Why don't you require that a DCAA auditor be present at all contract negotiations to ferret out and identify such abuses, at least on a test basis to determine if such action is cost effective?

Answer. As previously explained, cost estimates identified by DCAA as unsupported costs are not abuses. They represent for the most part engineering estimates of future costs that are not supported by past accounting history for the production of the same or similar items. In many cases this is because similar work was never performed before. Attendance by DCAA auditors at contract negotiations should and is based on the anticipated need for auditors to support the negotiation in the discussions concerning estimates based on historical data.

Question. OSD also answered on March 19th that defense contractors "do not submit billions of dollars in unsupported costs for payment." What is the OSD estimate of the dollar extent of unsupported costs being submitted by defense contractors, or does OSD care what it is?

Answer. AS previously explained, the unsupported costs identified by DCAA are not costs submitted for payment by the contractors. The unsupported costs are engineering cost estimates of future costs anticipated to be incurred under future contracts. This method of estimating is an acceptable practice and, in fact, in cases where the product has never been produced before, it is, at times, the only method of making the estimate. We do not therefore believe there would be any benefit to the Government to know the dollar extent of these estimates.

Question. When asked to do so, OSD provided no specific actions it plans to take to remedy this situation. When OSD was asked to provide examples where contractors were penalized in any way because they have flaunted defense regulations, OSD only answered, "Interest has been assessed, but penalties per se have not been imposed." There were no examples cited and no indication of the amount of interest normally assessed. Will you properly answer the questions submitted on February 22nd regarding this matter?

Answer. As previously explained, the question of whether a particular cost is allowable or unallowable is not always clear. Many times we are working in gray areas, particularly when we are dealing with overhead costs. Our procedures require the payment of interest if a contractor has billed and received unallowable cost. No other "penalty" is provided. At this time the interest that would be assessed would be 7 percent in accordance with the Cost Accounting Standards regulations. It is significant to note, however, that under our procedures of withholding money under our contracts that at the time we conclude our overhead negotiations with the contractors and make settlement on the individual contracts it is the Government that must make additional payments to the contractors. It is an unusual circumstance when our contract withholdings do not exceed the amounts finally determined to be unallowable under our contracts. Under these circumstance, we do not believe additional "penalties" are required. We will, however, request a change in the interest rate specified in the Cost Accounting Standards regulations when Congress establishes a new organization with authority to amend and revise those regulations.

Question. Quite often, contractors and DOD do not agree for several years on unsupported overhead charges. As a result, documentation is lost, there is "pressure" to arrive at a settlement, and the Government loses the use of its money. For example, if a contractor includes a million dollars of unallowables in his overhead, and if it is not settled for several years, when final settlement does occur, the contractor gets $500,000 and the Government has forfeited the use of $500,000 and paid related finance charges. Why does OSD feel it would be difficult to justify an increase in audit and contracting personnel solely for overhead settlements when obviously the contractors themselves apparently do?

Answer. As previously explained, because of our withholding procedures it would be an unusual circumstance where a contractor must return money to the Government as a result of the final negotiation of overhead rates. At the conclusion of these negotiations, it is normally the Government that must pay money to the contractors. Inasmuch as the condition in the question does not exist it could not be used to justify a request for more personnel.

[CLERK'S NOTE.—End of questions submitted by Mr. Murtha.]

GOODWILL CHARGES

Mr. LONG. Mr. Little just reminded me that if one looks to the accounting treatment of the General Dynamics purchase of the Defense Division from Chrysler, you would probably find in the accounting for that transaction some goodwill, because the hard asset value was less than the purchase price for whatever reason.

I don't happen to have the accounting treatment for that transaction, and I am not sure it is publicly available. I think you would find goodwill there.

Mr. ADDABBO. The only thing that concerns me, and I can understand ongoing corporations, many of them do have goodwill, but it has never been allowed. Why would we suddenly change and allow it as a consideration?

Mr. LONG. I don't have a good answer to that, Mr. Chairman. There is rationale on both sides of the coin on almost every issue of whether a cost ought to be allowed or disallowed.

You and I could sit down and effectively argue both sides of the question as to should interest be allowable or should other costs be allowable.

I have not examined the record. I haven't read the briefs in this case. Quite frankly, I never even thought about it until I saw your question. There are thousands of cases before the board. We don't monitor each of them individually.

Mr. ADDABBO. If the Armed Services Board of Contract Appeals decides that goodwill can be charged, would OSD then take that as a final decision or would there be some further consideration?

Mr. LONG. As you know, presently the Department of Defense has appeal rights from the ASBCA. Prior to the Contracts Dispute Act in 1978, the government could not appeal. That was true not only with respect to the ASBCA, but all the other governmental contract appeals boards.

We do have an appeal right. Whether we would appeal, we really can't determine now. The procedure would be for the Department to make its internal determination. If the determination were to appeal, then we would have to seek and obtain the approval of the Justice Department.

That is the mechanism built into the statute. There is an implication in the question that—why wouldn't you appeal? Well, maybe we wouldn't appeal because analytically it is the right decision. I am not saying that it is because I don't know, but I don't think we can answer that question in advance.

You can make a very effective argument with respect to any individual cost, that it ought to be disallowed because if you allow it it raises prices. I don't think that it is proper in dealing with the private sector, as we do, to make cost allowability decisions simply because it impacts the price.

Go back to what we talked about this morning. Our need is for a profitable industrial base, to be good competitive buyers and to induce and entice the holders of the productive resources, to manipulate these resources to our business. I think we have to factor in all of these things. I don't think making a determination of

allowability simply because it may increase our price is nearly enough of an in-depth analysis.

Mr. ADDABBO. As I said before, for all of the years of contracting, good will charges have not been allowed. For all the years of contracting, goodwill has been on the books for many of these corporations. They have bid for many years without being allowed goodwill. To suddenly give them that gift, if you just base it on past procedure, I think is something that has to be carefully reviewed.

Mr. LONG. I can assure you, Mr. Chairman, when the time is appropriate, it will be very carefully reviewed. I just cannot portend the decision.

M-1 FIRE CONTROL COMPONENTS

Mr. ADDABBO. When we discussed the M-1 fire control components a little earlier, Mr. Little said the decision on the second source had not been made. Has any recommendation been made to Mr. Ambrose? Do you know, Mr. Little?

Mr. LITTLE. Mr. Ambrose is handling this personally.

Mr. ADDABBO. Has he made any recommendation to OSD?

Mr. LITTLE. No.

Mr. ADDABBO. Do you know when the decision may be made?

Mr. LITTLE. No, sir.

Mr. ADDABBO. Will it be made by Mr. Ambrose or be made by OSD?

Mr. LITTLE. I couldn't tell you.

Mr. ADDABBO. Do you have any information on that, Mr. Long? Who will make the final decision on the M-1 fire control components? Will Mr. Ambrose make it, or your office?

Mr. LONG. I think it will be the Army's decision, but I am confident that Dr. DeLauer, Mr. Carlucci, and Mr. Weinberger will be advised of the decision and given an opportunity to comment on the matter.

Mr. ADDABBO. We would ask you to look into the question and supply for the record when a decision might be made.

[The information follows:]

The Army expects a decision on second source versus multi-year contract procurement of the M-1 fire control in the near future.

REPROGRAMMING FUNDS FROM PROCUREMENT TO RDT & E

Mr. ADDABBO. One of Carlucci's initiatives is to seek a change to existing practices, allowing reprogramming of funds for procurement of a given system to RDT&E for that same system without prior approval of Congress or OMB.

A stated reason is that such a change would allow a more rapid addressing of program problems, thereby decreasing the time involved in resolving those problems.

In order to learn how serious this situation is, last October we asked Dr. Borsting to tell us what percentage of total reprogrammings were for shifting funds from procurement to RDT&E for a given system. The answers were, 0.06 percent for fiscal year 1979, zero for fiscal year 1980, and 0.03 percent for 1982.

Do you continue to believe this is a serious problem?

Mr. LONG. I don't think the statistics which Dr. Borsting provided to the committee really reflected what we are seeking to accomplish. It is in setting up the funding of a program which is never precisely determinable, when it will be ready to transition into production. Nor is it precisely determinable in advance how much development money is going to be needed before that transition or before the time is right for that transition.

What we are seeking to accomplish by this authority is an ability to move procurement funds to R&D in order not to be put in a position where we are making that transition too soon. It oftentimes is a very wise investment to spend a little more in R&D as that may pay off many times over in reduced production costs.

Under the present authorities, we can move funds under the reprogramming within the R&D account, and if, in a particular program, we need some R&D money in order to save future production money or bring development along to a little later stage, we have to go to another development account rather than that same weapons system account. I think if we had some authority at some reasonable levels, to do this without having to burden the Congress in each instance, it would make the process more efficient.

If we were to rank all of the matters we are dealing with, I wouldn't sit here and tell you that this is the highest priority item, but I believe it is something that would improve the efficiency of the process at no real great financial risk to anybody.

Mr. ADDABBO. The record is filled with examples of the higher costs and added problems caused by entering production too soon.

Has DOD ever considered the alternative of simply sending up a rescission of procurement funds which have been requested prematurely?

Mr. LONG. I am sure we have, although I don't know whether you are using rescission in a technical budgetary sense or whether you are talking about program cancellation.

What I would like to do, if I may, Mr. Chairman, is get into the details of that question for the record.

[The information follows:]

One of the most perplexing programing problems is the transition from R&D to production funding while maintaining program continuity. The funding flexibility initiative was designed to provide a mechanism for the orderly resolution of technical problems which are revealed during the final testing phases. These deficiencies are not serious enough to warrant deferring the program for a year and can usually be resolved in a relatively short time period. Past experience indicates that only production funds are available; however, the problem resolution should be properly financed within the RDT&E appropriation. This resulted in decrementing on-going R&D programs to finance the emergent requirement. If DoD had the flexibility to tranfer procurement funding to R&D, emergent problems could be resolved on a timely basis without adversely impacting on-going programs.

Rescission of production funds would leave the program manager without resources for problem resolution and totally disrupt contractor work force, schedules, vendor qualification, and production learning curves resulting in inordinate cost growth.

Mr. ADDABBO. Does this not sound like a serious indictment of DoD's current methods? Should not schedules be realistic, as opposed to "success oriented?"

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[The information follows:]

Schedules should be both realistic and success oriented. It is not an either or proposition. The primary objective of the acquisition process is to translate technology into operational hardware and issue it to our forces as soon as possible. We do not want to lose time in fielding equipment because we are competing against the increasingly more capable equipment of the Soviets. Delays cause increased obsolescence and contribute to equipment aging. It is also costly to unnecessarily stretch out development and production. A balance must be sought between the economies of an effective early transition to efficient production rates and the cost of subsequent modifications and maintenance and support problems when difficulties arise. Such a balance is not an easy calculation. In a practical sense it is not possible to have completely sequential development and production programs. Our systems are too complex in design and in the manufacturing processes and methods used to produce them. The truth of the matter is, we must produce operational quantities of a "productionized" design using production tooling and methods before we can say the development is complete. The users always find new problems and develop new scenarios for equipment which generate design changes. The military need or threat itself is ever changing. The very purpose of production acceptance and operational tests is to confirm and substantiate the adequacy of production equipment. Test data on strictly prototype hardware does not generate sufficient confidence.

Mr. ADDABBO. Indeed, are not many of DoD's troubles in this area caused by DoD's allowing the proponents and advocates of programs to bite off more than they can chew?

[The information follows:]

Problems will always occur on a complex program whether it has a high degree of concurrency or it is more leisurely paced. We frequently find we have bitten off more than we can chew. Two of our acquisition improvement initiatives are aimed at easing the digestive process. Preplanned product improvement is used to identify and isolate technologically troublesome characteristics and subsystems for evolutionary development and later incorporation. This initiative serves to reduce overall schedule risk. Another initiative provides for budgeting amounts to cover technological risk. This initiative leads to more realistic cost estimates and the ready availability of resources to more speedily correct problems when they arise.

REVIEW OF REPROGRAMMING PROCEDURES

Mr. ADDABBO. We have previously suggested that a significant reduction in time to process reprogrammings would be made by DOD's streamlining its procedures.

Last October we provided Dr. Borsting with an example of a Navy reprogramming which was initiated in October 1980 and reached this committee in July 1981, at which time the Navy told us it was urgent and had to be approved immediately.

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Dr. Borsting stated, "Of course, we have been revising all our procedures, as I mentioned earlier. We certainly owe you that this won't happen."

Have you in fact completed this revision of your reprogramming procedures?

Mr. LONG. I am sure that the reprogramming procedures that we use now are better than the ones that were in place. Are they sufficiently streamlined? Are we satisfied?

I think the answer to that is no.

I will be happy to supply for the record the specific changes that the military departments and OSD have made in their reprogramming procedures. We are trying to streamline the DSARC procedures I mentioned earlier. We are trying to do the same here.

[The information follows:]

Our efforts to streamline the reprogramming process have been twofold. The first initiative was to reduce the number of reprogramming actions requiring OSD and congressional consideration. The approval by the Congress to increase the reprogramming thresholds significantly contributed to the streamlining of the process. Favorable consideration of our proposal to permit the transfer of funds from procurement to research and development for the same program as a notification action would further assist our efforts.

The other aspect of our streamlining initiative is in the area of timely processing of reprogramming actions. Extenseve efforts are underway to minimize the time to prepare, coordinate and receive appropriate approvals of reprogramming actions.

Mr. ADDABBO. Again I understand within the military things do take a long time and word doesn't usually get down to the echelons where the work is being done. We have several reprogrammings pending before the subcommittee. One of them is for the U.S. Marine Corps that has been in the works in the Navy since January. That is not too bad. Only five months.

Mr. LONG. Better than the nine months in your first example.

Mr. ADDABBO. As I said, you are streamlining.

Why will this streamlining of your procedures not be sufficient to take care of the problem addressed by the cited Carlucci initiative?

Mr. LONG. It is a help, Mr. Chairman. I don't think it goes the whole way. Maybe that is as far as it will go or as we should ask it to go; but I think we still see some benefits to—within limitations—some ability to reprogram within a program of R&D and procurement funds.

Mr. ADDABBO. Mr. Edwards?

FRONT-END FUNDING OF TEST ARTICLES

Mr. EDWARDS. One of the Carlucci initiatives calls for increased "front end" funding of programs for more test articles.

The supporting rationale notes that too few test articles forces a sequential approach to development and takes more time.

The approved action was: "USDR&E ensure that the acquisition strategy identify plans for and funding required to acquire adequate subsystem and system hardware to reduce overall schedule time and risks."

What specifically is being done to implement this approved action?

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Mr. LONG. In the major systems acquisition directives—and this was not the case heretofore—it is now a specific item of direction. That in itself doesn't tell you much.

In connection with the DSARC reviews, it is a specific agenda item and the program managers, in presenting their programs to the DSARC first have to give the council the information on the test plan, including test hardware. They are subject to questioning during the DSARC meetings and pre-briefings themselves. In a number of instances—at least some instances—the result of that process has been that the program has been increased to front end test hardware. In the recent helicopter program DSARC there was a specific direction by the Council: Acquire this piece of equipment for additional front end testing. So the system is working.

Unfortunately, as you know, it takes a while for weapons systems to go through their entire cycle, so we don't have a lot of historic data to show you the savings from this, or the effect of this; but we are able to show you that since April 30th of 1982 we have moved down a path consistent with that initiative because we think it makes sense.

Mr. EDWARDS. Overall, how much will this particular initiative add to the cost of the development programs funded in POM 1984 and what will we get in return for that added cost? You may want to do that for the record.

Mr. LONG. I will do that for the record.

[The information follows:]

Since 30 April 1981, Director Defense Test and Evaluation has reviewed 21 programs as part of the DSARC process. Front-end test hardware was increased for two of these programs, Advanced Attack Helicopter (AAH) and Army Helicopter Improvement Program (AHIP). The breakdown of increased hardware cost by fiscal year is as shown below:

FRONT-END FUNDING INCREASE

[In millions of dollars]

fiscal year	AAH	AHIP
1981		1.155
1982	1.74	0.140
1983		1.828
1984		

The increased funding for the AAH program was to provide increased reliability and testing flexibility via procurement of additional Target Acquisition Designation sight components for additional testing prior to production. Additionally, this funding provided for testing of the Automatic Test Station software and the Fault Detection Location System.

In the case of the AHIP, the additional two pieces of hardware will permit the program to arrive at the operational testing milestone II with a mature mast mounted sight and a mature control and display system. Further, the automatic test equipment will be sufficiently mature to permit use and evaluation during operational testing.

The return on investment must be subjectively estimated in a program-by-program assessment. This is done as part of the program development and budget development processes. The intent of initiative 12 is to reduce developmental risk and time of development by providing for concurrent testing. If these premises are correct, and it is believed they are, the resultant program costs will be less.

Although the Air Force in its fiscal year 1984 POM development considered four programs for increased funding, none of these proposed increases survived the

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budget process. The mechanism requiring Service review during the POM development is just now being implemented and will undoubtedly have some impact on FY-85 POM developments. As indicated in the prior analysis, no increased funding for initiative 12 is projected in fiscal year 1984.

Mr. EDWARDS. Historically, at least in view of this committee, pressures are always generated to curtail testing when a program gets into cost or schedule trouble.

AMRAAM fly-off tests were reduced from 32 to 20.

A production decision for Pershing II is being based on no test flights.

Patriot was forced to go back into testing after production had begun.

So was the AIM-7M.

What assurance do you have that this initiative will not simply add costs to articles for tests which will later be curtailed or dropped altogether?

Mr. LONG. My reaction to that, Mr. Edwards, is that assurance only lies in the management of the process. I can't give you assurance except to tell you that the notion of budgeting money for front end test hardware and then cancelling the test is absolutely inconsistent with all the entire philosophy and management principles that the Department—not just Mr. Carlucci—is seeking to ingrain into its way of doing business.

PERSHING II TESTING

Mr. EDWARDS. Let me stop you there and get very specific for a moment.

Last year the Chairman and I squared off on the floor on the subject of Pershing II. I was arguing that it was necessary to go forward with the Pershing II if we were ever going to get an agreement with the Soviets.

We simply could not stop it; we had to keep going with it, so we had something to bargain with. Lo and behold, here we are getting ready to go to the floor soon, sometime this year, with a proposal for Pershing II to go forward, and it has not been tested.

What am I going to argue on the floor this year if the Chairman and I square off again?

You see, my theory is—this is an open hearing today, I guess. Yes, we are open. My theory is that the Soviets know more about some of these things than we do. It is their business to keep up with this.

I don't think we are fooling anybody going to production of the Pershing II when we haven't tested it; we are fooling ourselves. We are not fooling them. I suspect we are not even fooling our allies who also pretty much know what we are doing.

What am I going to say on the floor this year? You have a speech you want to write for me?

Mr. LONG. I would be happy to provide the analysis for that decision for the record. I can tell you that the objective is to have a test plan in terms of ongoing development programs that makes sense. That doesn't mean that under particular circumstances with respect to particular programs we will not deviate from a particular path.

I don't know all the exigencies that went into or will go into the decision whenever it was made or will be made on the Pershing, but I will be happy to provide that for the record.

[The information follows:]

Although there have been no PERSHING II flight tests to date, there has been a massive amount of component, subsystem, and ground testing of the missile and the ground support equipment. This testing includes several thousand equivalent missiles flights in capative flight testing of the terminal guidance system, 15 static motor firings and over 500 flight simulations. The results of this type of testing provide the statistical confidence that the system will perform as required. The flight tests, while they are important and necessary, serve only to validate and verify the results of the previous testing which, to date, has been very successful. There is no guarantee that problems will not arise in the flight tests but all indications are that even if problems do surface they should be of a relatively minor nature, easily corrected by a retrofit on the production line.

The Space Shuttle provides a good analogy even though the extent and type of testing differs between the two systems. On the first flight of the Space Shuttle the astronauts could be placed aboard with confidence because of previous testing which had been conducted. The Army can begin production of PERSHING II for the same reason.

Mr. EDWARDS. Should we be going into production when we haven't even had any tests?

Mr. LONG. I can't generalize. I can only tell you that as a matter of philosophy we should do adequate testing before we go into production, but that is not to say that there will not be circumstances where there is compelling rationale to deviate from that normal game plan.

Mr. EDWARDS. I will buy that, but it just seems like it is happening too much.

Mr. LONG. I don't disagree with that at all.

Mr. EDWARDS. In all fairness, does the Chair want me to yield equal time for anything?

Mr. LONG. May the General comment before we pursue the question?

Mr. ADDABBO. I just hope they give you a good argument.

AMRAAM OFF-FLIGHTS

General CONNOLLY. Congressman, you mentioned the AMRAAM. I would like to comment briefly on that. We reduced the number of new off-flights on AMRAAM from 32 to 20 because we felt in a validation part of the AMRAAM program ten were sufficient and we actually only fired eight per contractor.

We felt that was sufficient to validate the concept and also to select the winning contractor.

In the full-scale engineering and development program, we are going to have 94 test missiles, of which 87 are going to be fired before we get into full scale production.

We believe there is going to be adequate testing.

Mr. EDWARDS. Are you asking for any production money in the 1983 budget?

General CONNOLLY. I don't know that personally, sir, but I will provide that for the record.

[The information follows:]

No. There are no production funds for AMRAAM in the FY 83 budget request.

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TEST FACILITITES WORKLOAD BACKLOG

Mr. EDWARDS. Staff says you are not.

For the past three years we have been told that test ranges and proving grounds, particularly those of the Army, have large work backlogs.

If these facilities are already overloaded, how will they be able to accomplish more of the parallel kind of testing you say is needed?

If these facilities must somehow be upgraded to accomplish this, how much will that upgrading cost?

Mr. LONG. I would defer to my colleagues for specific comments on the test ranges. I will be happy to supply whatever information is appropriate for the record.

[The information follows:]

The Director of Defense Test and Evaluation has been pursuing with the Services, an aggressive Improvement and Modernization (I&M) program for the past several years to ensure that our national ranges and test facilities can continue to keep pace with the increasingly complex weapon systems using T&E; as an example, we are constructing a national High Energy Laser Test Facility at White Sands Missile Range to test this embrionic technology, we will be making use of such emerging equipment and technologies such as, solid state electronics, Packet Radio, fibre optics. laser data transmission, phased array radars, NAVSTAR and improved display systems, to cite a few examples. These will provide us with the capability to increase data rates and thereby reduce individual weapon systems required range time. All these techniques and equipment, along with contractor augmentation will preclude significant test load increases at our ranges for the foreseeable future and will ensure that these national assets will continue to be efficiently utilized. Since FY 1980, we have experienced modest growth in our test facilities funding to sustain this aggressive I&M program.

General Connolly, do you have any observations on that?

General CONNOLLY. No, sir, I don't.

I can provide those Air Force facilities, what the situation is there. I am not aware of any severe problem personally. I will provide it for the record.

Mr. LITTLE. You are right. White Sands has been pulled.

Mr. EDWARDS. Is that in part a reason for not following through on the whole testing program?

Mr. LITTLE. No sir, we could have gotten it in if we had had the rounds there, I am sure.

Mr. EDWARDS. You attribute that to something other than the amount of work at the test facility?

Mr. LITTLE. I attribute it to that, but I don't have the facts. We will have to get you the facts.

[The information follows:]

The workload at the Army's major ranges and test facilities exceeds the personnel capability to conduct development, production and product improvement testing of the large numbers of systems that are in the Army's extensive modernization program. For example, the workload projection for FY 1983 exceeds capability by 19% for White Sands Missile Range, NM. To cope with this situation, major systems are given priority and are kept on their critical paths to meet schedules by overtime, overhire and borrowing labor from other Army organizations. Augmentation of existing contractor support is also applied to reduce the backlog. The improvement and modernaization (I&M) program for test instrumentation includes a major objective of reducing workload by providing instrumentation that requires fewer operators and maintenance personnel. The I&M program for the major ranges and test facilities for FY 1983 is funded at $52.6 million. With respect to the Pershing program, a decision was made to accelerate the acquisition to meet an earlier initial operational capability date. This results in most of the final development and the operational

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firing tests being conducted after the production decision. The excessive workload at White Sands Missile Range, NM, did not impact on the schedule or decision since Pershing is a major system with the highest priority.

WEAKNESSES AT DEFENSE PROCUREMENT OFFICES

Mr. EDWARDS. Thank you, Mr. Chairman.

Mr. ADDABBO. As we proceeded through our studies for today's hearings, we realized there were certain weaknesses existing at the Defense Procurement Offices. These weaknesses range from (a) failure to consolidate procurements in order to take advantage of economic production with resultant lower prices, (b) categorizing prices as competitive when in reality this was not an adequate basis for accepting the proposed prices, and (c) using competitive negotiation procedures with best and final offers when sole source negotiations would have been more effective and economical.

In answering a question regarding this matter, OSD stated on March 19th, "We do not condone these deficiencies. These practices are not in accord with the intent of our policies and procedures."

Why does OSD believe that the examples cited in the committee's investigative staff report are not representative of a widespread condition?

Mr. LONG. I think the system that we have under which we provide the environment for our acquisition is by and large a system that works. As I said earlier today, we have somewhere between twelve and thirteen million procurement actions a year.

We tend, in dialogues like this, with the GAO, the S&I team, to focus on where the system doesn't work, but seldom do we focus on the millions and millions and millions of procurement actions that go just fine.

To look at our own data and see that we bought the same spare under four different contracts over an eight month or ten month period and then go from that anecdotal item to a notion that the system doesn't work, I just don't think that is not a proper analysis. Yes, the system is imperfect. It is made up of human beings with all the human frailties; but by and large the system does a good job.

The failure to consolidate procurement is a matter that we know occurs from time to time. We have ongoing educational activities; we have ongoing efforts to improve our communications so that the acquisition party in one office knows what his colleagues in other offices are buying so that we can do a better job; but that doesn't mean that it is a widespread condition. It simply means there are problems we have to deal with and we deal with problems every day.

I don't mean to be non-responsive to your question, Mr. Chairman, but that is my view of our system with its problems and how we are attempting to deal with them.

You can look at your (a), (b) and (c) in this question categorizing prices as competitive when in reality there was not an adequate basis for accepting the proposed prices. I am not sure what problem that goes to, but, as you know, there is a dialogue between the Department and GAO, and perhaps your committee and the S&I team, on what the proper way to reflect procurement data is when one is talking about competition versus non-competition versus

follow-on contracts to originally competed contracts. There are lots of different ways to present the data. We try to present it in a way that makes sense. Reasonable people can differ.

Item (c), using competitive negotiation procedures with best and final offers when sole source negotiations would have been more effective and economical, that strikes me as an anomalous question from the Committee because we get beat upon all the time for not competing. This question implies that we ought to have known that sole source negotiations would have been more effective and economical. The fact of the matter is, you make your judgments in those cases on the front end without really knowing how they are going to come out, and you do the best job you can.

Sometimes we will sole source when we ought to compete. Sometimes we will compete when we ought to sole source. We make the best front end determination that we can and we could look back with 20/20 hindsight and say we made a mistake, and that happens.

Mr. ADDABBO. Again I am happy that you are working with GAO and our S&I staff. Their interpretation and your interpretation may be different. They may be the same. The important thing is that there is a correction of some of the abuses.

What concerns me is that in the answer to the questions on March 19th you stated through procurement management and internal audit reviews these matters are called to the attention of purchasing offices. That is great.

You call it to their attention. Is there any follow-through to see that corrections are made and that they are then better monitored to make sure it is not an ongoing practice?

Mr. LONG. The answer to that is yes, but I cannot tell you that with respect to each instance of your example of a failure to consolidate procurements in order to take advantage of economic production rates will not occur again. I can't tell you that each time somebody in management comes across a situation like that and pushes it down in the system to try and see that it doesn't happen again, that there is precise follow-up.

There are management systems to follow up those things generally. I think that the system of feedback to management on how the process is being implemented is a pretty good, but again an imperfect, system. I can't tell you we follow up each specific management direction, on each of these.

There are just not enough hours in a day to do that.

Mr. ADDABBO. I agree with you.

As has been pointed out by our S&I and the GAO staffs and by your internal audits, there are many imperfections.

Again, looking at the cases where we have sought competition and the benefits of competition and when we look at a report that gives us eleven percent competition and 89 percent sole source——

Mr. LONG. I want to state for the record I disagree with those figures. I don't know where they came from. I will have to review that report again.

Mr. ADDABBO. I wish you would.

Mr. LONG. I have reviewed that report. I just don't recall that specific set of numbers. That is inconsistent with our DD Form 350 numbers by a lot.

Mr. ADDABBO. That was given to us in the S&I preliminary report which we gave to Secretary Weinberger.

Mr. LONG. I have seen it. I just don't recall the rationale for that. I am telling you our 350 shows very different data.

Mr. ADDABBO. As you say, it is a damaging statement. If there is some explanation, I would appreciate having it and having it supplied for the record.

[The information follows:]

We do not know where the figures of 11 percent competition and 89 percent sole-source came from. We have never recorded figures in those ranges.

We assume that the 11 percent competition figure may be the percentage of formal advertising during some portion of some fiscal year, such as fiscal year 1981. Not considered were other price competition or design/technical competition.

For the entire fiscal year 1981, competition percentages were as follows:

	Percent
Formally advertised	7.9
Other price competition	25.5
Design/technical competition	7.4
Total competition	40.7

Note.—The sum of the individual percentages do not total 40.7 percent due to rounding.

Mr. ADDABBO. Secretary, gentlemen, thank you very much for your answers.

There are several other questions, as you know, that we would like to have answered.

[CLERK'S NOTE.—Questions submitted by Mr. Addabbo and the answers thereto follow:]

ARMY DECENTRALIZED PROCUREMENT OPERATIONS

Question. An Investigative Staff study conducted in 1956/1957 made the following finding:

"Army, particularly Ordnance Corps, is experiencing considerable difficulty in accomplishing expeditiously, supplements and formal amendments to contracts. This is occasioned by the division of responsibilities in its (Ordnance) decentralized procurement operations".

How can DoD be assured its decentralization effort might not run into the same problem encountered 25 years ago?

Answer. The Investigative Staff findings on decentralized procurement in the Army more than 25 years ago appear to address an entirely different situation than the one at issue today. Since at least the late 1960s, there has been a move away from functional specialization toward a project-oriented management structure in defense system acquisition. What we are aiming at today is decentralization to the lowest level in the organization where a comprehensive view of the objective exists. This decentralization will facilitate, rather than inhibit, the timely formation and modification of contracts.

HIGH RISK TECHNOLOGY

Question. In announcing his initiatives, Mr. Carlucci affirmed "We must examine evolutionary alternatives which use a lower risk approach to technology than solutions at the frontier of technology."

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Please provide a listing of the systems or programs which have been changed to provide for lower risk approaches than were previously planned, as a result of this affirmation?

Army Answer: The evolutionary approach which reduces technological risk and consciously inserts advanced technology through planned upgrades of certain subsystems of deployed systems is called preplanned product improvements. The FY 83 President's Budget has pre-planned product improvements identified for the following systems:

ABRAMS Tank program which includes a coordinated plan that integrates improvements in maintenance and support into the existing block changes to the tank on the 120mm gun, armor, and NBC protection.

BRADLEY Fighting Vehicle systems which have block improvements for fire control for TOW II missile integrations and NBC Hardening.

Other systems are being examined now for possible pre-planned product improvements. The candidates include:

AH-64 APACHE Modifications
155mm Self Propelled Howitzer Improvements
Joint Tactical Communications
UH-60 BLACKHAWK Modifications (RDTE starts in FY 84)
Advanced Field Artillery Tactical Data System
Patriot Air Defense Missile System.

Navy Answer: Listing of Major Navy Systems structured to provide evolutionary alternatives (Preplanned Product Improvement (P^3I)):

LAMP	TACTAS
HARM	F/A-18
JTIDS	ASPJ
AMRAAM	DDG-51 (DDGX)
TRIDENT II	SUBACS

For example, the TACTAS configuration/design was frozen in order to reduce risk, complete development and achieve a timely IOC. Efforts to upgrade and evolve the system (software, and computer improvements) to meet an increasing threat are presently planned to begin in FY 1985.

Air Force Answer: Acquisition Improvement Initiative #2, Pre-planned Product Improvement (P^3I), establishes an evolutionary approach to systems acquisition through the use of planned upgrades to reduce technological risk. These upgrades are to use demonstrated technologies.

The Air Force weapon systems that have significant P^3I applied are F-15, F-16, HARM, and AMRAAM.

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Question. Given this affirmation, why is DoD requesting large real growth in funds for the Technology Base?

Answer. Mr. Carlucci's statement is not intended to imply that the U.S. is not going to depend on technically superior weapons systems and equipment. Rather, the statement addresses the prudent selection of mature technologies for use in weapons systems to reduce technological risk. The technology base provides our long term technological options for use in the development of future systems. We are now using technologies developed in the late 60s and early 70s. The technology base of today will provide for technically superior weapons in the 90s. To ensure that we have a viable set of technical options for this period, the Department believes it must undertake at this time an aggressive technology base program so that industry, universities and in-house laboratories will have the means by which they can meet the national security needs of the future.

Question. Does spending large sums on the technology base create pressures and constituencies to use solutions at the frontiers of technologies?

Answer. This may or may not be the case depending on the circumstances. The technology base creates the opportunities, or options, for the subsequent development of new and improved technically superior systems. These systems are essential in a world of constantly increasing weapon capabilities being fielded by our potential adversaries. It is the U.S. strategy to maintain a technological lead and the technology base is the foundation for this lead. If pressures or constituencies evolve from this process, it is the role of DoD to select out those options which are technically mature for inclusions in our future systems. Improvements in that process are the basis for the Deputy Secretary's statement, not that we are going to develop less technically capable weapons in the future.

Eliminating Poor Contract Performances

BUY-INS

Question. Please tell us what you are doing to weed out buy-ins, and how your practices now differ from those formerly used:

Answer. The term "buy-in" has an unfortunate connotation of outright dishonesty in a contractor's proposal. In many cases, it would perhaps be better described as unwarranted optimism that in a given program we will be fortunate enough to find the perfect

solution to a problem without any false starts. Experience in any R&D endeavor, not just in defense systems, tells us this is unlikely.

Running throughout the acquisition improvement program is an emphasis on realism and a more conservative approach to new development than may have been practiced in the past. For example, pre-planned product improvement, more realistic estimates, budgeting to most likely cost, acquiring an adequate number of test articles, and increased program stability are all a part of this general theme.

Question. Now that this initiative is in effect, may we assume that any cost overruns we see in the future will not be caused by buy-ins?

Answer. Neither I nor anyone else can give unqualified guarantees about matters which are not totally under our control. There will continue to be instances where estimates turn out to be wrong or unrecognized problems result in cost growth. Let me just say that we have made an honest and determined effort in our acquisition improvement program to deal with a problem which has given us too many instances in the past where our and the contractors' estimates were on the low side.

INITIATIVES TO IMPROVE CONTRACTOR PERFORMANCE

Question. Please tell us specifically what new measures of contractor performance you have developed and put in effect as a result of this initiative: Also, describe how specifically you will use these measures in future source evaluations?

Answer. Initiative number 20 on improving the source selection process stated that some contractors have performed poorly and that in some instances the source selection process did not sufficiently take into account past performance or plans for future phases of a program. This initiative recommended that added emphasis be placed on past performance, schedule realism, plans for production facilities, and cost credibility. Our existing directive already addresses each of these areas so that new measures are not what is being called for. Rather, we are placing renewed emphasis on compliance with our existing policies.

INDUSTRIAL SECURITY

Question. We have had some serious breaches of security by contractors in the recent past. Chief among them were the incidents at TRW and at Hughes Aircraft Company. Are lax security procedures a reason for eliminating a contractor?

Answer. Yes, depending on the nature and severity of the security problems. Contractors must have an industrial facility security clearance to work on classified contracts. Such clearances are issued after a careful inspection of the physical and procedural safeguards for classified information at the plant, and periodic reinspections are performed. Any firm that fails to qualify for a facility security clearance, or whose clearance is revoked due to security deficiencies, is ineligible for classified contracts. In addition, security weaknesses that may not be sufficiently damaging to warrant cancellation of a facility security clearance would nevertheless count against a company competing for a classified contract.

Question. Does a contractor incur any financial liability as a result of security breaches?

Answer. Not directly. However, depending on the circumstances, failure to comply with contract security requirements could theoretically lead to contract termination for default. That, in turn, could result in government claims for excess reprocurement costs and perhaps damages if warranted. We should point out that we are unaware of any such occurrences, and industry's security performance has, in general, been very good.

Question. Has the compromise of such systems security breaches in the past resulted in the initiation of modifications to any systems, subsystems, or components thereof, and, if so, what were the associated costs, and who was financially responsible?

Answer. We are unaware of any modifications in DOD equipment that were needed because of contractor security lapses. The TRW incident involved CIA equipment, and we do not know what steps they took.

CONTRACTOR'S PERFORMANCE IN MEETING COST ESTIMATES

Question. Does OSD keep a "profile"of each major contractors performance in terms of its meeting the cost estimates in contracts it has won in the past? If so, provide it for the record. If not, why don't you keep such a profile?

Answer. OSD does not keep a "formal profile" because the capability to perform on future contracts is dependent on factors that may be unrelated to previous cost performance. However, past performance in meeting cost estimates is given appropriate consideration when evaluating the cost realism of proposals for future contracts. Cost realism is one factor along with technical ability, management capability, financial and resource capacity, that determine whether award should be made to a particular contractor. Even though past cost performance may provide some degree of insight, the greatest reliance must be placed on estimates of a contractor's current ability to meet current requirements.

PREPLANNED PRODUCT IMPROVEMENT

Question. One of the "Carlucci Initiatives" is called "Preplanned Product Improvement" which involves the following: "Most new and existing systems should be partitioned for performance growth through the application of sequential upgrades to key subsystems in order to reduce development risk, and take best advantage of technological advance." What specific steps has the Department of Defense taken to implement preplanned product improvement?

Answer. On 6 July 1981, OSD issued a Department wide Pre-Planned Product Improvement (P^3I) Implementation Plan. This plan was addressed to the Secretaries of the Military Departments, Chairman of the Joint Chiefs of Staff, and the principal members of the OSD staff. The plan established P^3I criteria applicable to both new and on-going program. P^3I focal points have been established in each of the three Services and supporting networks in subordinate commands. The Defense Guidance and POM Preparation Instructions in support of the fiscal year 1984 budget and fiscal years 1984-88 Five Year Defense Plan required the Services

to list programs with significant P^{3}I content. Each program's acquisition strategy is routinely reviewed at program decision milestones.

Question. To what specific systems has DoD applied Pre-Planned Product Improvement?

Answer. The Defense Guidance and POM Preparation Instructions for the fiscal year 1984 budget and fiscal year 1984–1988 Five Year Defense Plan required the Services to identify major programs with significant P^{3}I content. The following systems were listed: Army, M-1, BRADLEY FV, AH-64, 155mm Howitzer, BLACKHAWK, Advanced Field Artillery Tactical Data System, TRI-TAC; Navy, LAMPS, TACTAS, F/A-18, ALWT, DDGX, CAPTOR, TRIDENT II, SUBACS, Air Force, B-1, F-15, F-16, IR MAVERICK, EF-111A and AWACS. In addition, the HARM, ASPJ, JTIDS and AMRAAM are joint Navy, Air Force programs having P^{3}I content.

Question. Wouldn't there be a danger of placing a system in the field that had not been adequately developed and tested, and therefore, not meet the threat it was intended to meet. How does DoD plan to avoid such a danger?

Answer. P^{3}I when applied to a program at its inception, aims to isolate and defer troublesome characteristics and associated componentry. In this manner the development and test program have a higher probability of meeting schedule and achieving an earlier IOC (Initial Operational Capability). This approach assumes that the threat is also evolutionary in nature and that a completely evolved system is not necessary to initially counter the threat.

Question. Wouldn't this type of management effort have a tendency to increase the cost of a system due to the possibility of prematurely interrupting the development and testing cycle in order to place the system in the field.

Answer. No. The system can be placed in the field earlier because the high risk areas have been deferred. There would be less likelihood of the development and test program being interrupted due to technical difficulties.

Question. While the Committee agrees that systems need to be placed in the field as quickly as possible, it also believes they need to be adequately developed and tested before production is started. The pre-planned product improvement effort would tend to encourage greater concurrency between the development/testing and the production phases which in some cases have resulted in large cost increases, and systems being fielded that did not function properly.

Is DoD fairly confident that this situation is being avoided?

Answer. P^{3}I works to reduce concurrency because it defers the "long pole in the tent" category of system characteristic which usually paces the development schedule and invites risk taking in order to deploy the system earlier. P^{3}I should be viewed as a means of achieving adequate development and testing before production is started, P^{3}I is not appropriate for subsystems which are essential to the equipment's performance and its ability to meet the threat. P^{3}I on an existing equipment is also effective in avoiding initiation of a complete new system. Here, as in any development, a realistic appraisal must include determining if technology will support the im-

provement. It is possible to misjudge this aspect on an improvement program as well as on a new start.

Question. The reason I ask this question is that in the fiscal year 1983 budget, DoD is requesting funds for programs that appear to fit into this category. Let me cite a few examples:

The MK-48 Advanced Capability Torpedo and the Advanced Lightweight Torpedo programs have both experienced very large cost increases over the years. Both programs are proceeding to full scale engineering development before advanced development is completed. Both of these programs are dependent upon the development and production of an advanced targeting system in order to be able to adequately test both systems, and the targeting system won't be available until both programs have advanced way down the development and testing phase.

The Army and Marine Corps are engaged in a joint effort to select a Light Armored Vehicle. Vehicle selection is supposed to take place in July with the production decision to be made at the same time. Some of the vehicle designs are fairly new to the industry such as an eight wheeled version of the LAV. Some variants of the LAV might not even be field tested before the July decisions. What is DoD's response to these situations?

Answer. Neither the ALWT nor ADCAP program is formally operating under a Preplanned Product Improvement concept. Considerations of possible Preplanned Product Improvement concepts have recognized the potential pitfalls associated with fleet introduction below specs or threat level. Such introduction is not occurring. Some degree of planned concurrency does exist in the development and production of both the ALWT and ADCAP programs. The extensive testing which precedes Full Scale Engineering Development (FSED) preproduction decisions (and production decisions) is consistent with current DoD acquisition policies and is based on sound program objectives.

Both programs have been restructured recently when cost growths warranted intervention but the cost growths were not associated with a Preplanned Product Improvement implementation. The new target development associated with the ALWT program is under direct control of the ALWT program manager so that it stays on track for the appropriate test phases. The ADCAP program is modifying existing targets to provide adequate testing. Both systems use extensive computer simulation tests which are validated by in-water runs.

The vehicles presently competing in the LAV program are not production vehicles but they are technological extensions of production vehicles; example, the V150 Armored Vehicle we are testing is a stretch model (18" longer) of the V150, already in production and being sold to Saudi Arabia. The V300 six-wheeled armored vehicle is an extension of the V150 using many of the same components. The eight-wheeled Piranha produced by GM of Canada is developed from the Cougar and the Grizzly armored vehicles which are already employed by the Canadian Army. The only difference in the track vehicles provided by Alvis Limited of England is that the test vehicles have an automatic transmission and are diesel powered while the production models are gas powered and have a manual transmission. The testing of the candidate vehicles has been exten-

sive They have collectively been driven 87,214 miles over a measured course consisting of 30 percent unimproved roads and 40 percent cross-country. The original goal was 64,000 miles. Approximately 41,000 rounds of 25mm and 115,000 rounds of 7.62mm ammunition have been fired during the test. The test vehicles have been subjected to operational tests under both 50 and 200 miles scenarios. All the operational tests have been used to verify the RAM standards established for the LAV program. In addition, operational tests have been run against threat scenarios. The threat scenarios consist of five segments. (1) A reconnaissance mission 93 KM long, (2) night raid 64 KM long, (3) delaying action 88 KM long, (4) night attack 26 KM Long and, (5) day attack 31 KM Long. All the variants of the LAV that the Army intends to procure have undergone the testing described above.

Question. Wouldn't part of the answer to the overall problem of fielding systems in a timely manner be not to develop high technology systems that greatly exceed the proposed need or threat? What management improvements have been implemented to guard against this problem?

Answer. High technology systems are necessary to meet increasingly sophisticated threats. The Soviets are making significant technological advances which must be effectively countered. The characteristics of the system selected to counter each threat are closely examined during the requirements determination process and conceptual phases of the acquisition cycle to eliminate unneeded features or to defer them under the P^{3}I concept, until the threat may further develop.

P^{3}I is, in itself, one such management improvement. The DoD acquistion process requires consideration of product improvements as alternatives to new development. This consideration is specified in DoD 5000.1 and is embodied in the acquisition cycle conceptual phases. Other acquisition improvement initiatives provide safeguards, such as budgeting adequate funds for technological risk and providing front end funding for test hardware. A technological assessment is made of each program and is included in the documentation reviewed at milestone decisions.

Question. What steps have been taken to ensure that preplanned product improvement will in fact be planned future upgrading of weapon systems, and not a method for delaying correction of development problems until after the system is deployed?

Answer. DoD policy is clearly enunciated on this point. The 6 July 1981 implementation plan states: "P^{3}I is not to be used for correction of deficiencies encountered in the basic development. In particular, P^{3}I is not a test and fix technique to achieve reliability, availability, and maintainability (RAM) specified for initial operation. . ." Follow up on this guidance is a function of the DSARC and PPBS processes wherein each program's P^{3}I content is examined for compliance with the implementation plan criteria.

Steps To Reduce Costs and Time

ADMINISTRATIVE COSTS

Question. Another "Carlucci Initiative" is to reduce administrative costs and time to procure items. While I think everyone agrees administrative costs should be reduced wherever possible, caution has to be exercised in order to avoid costly mistakes.

What specific steps has the Department of Defense taken to reduce administrative costs and time to procure items?

Answer. Specific steps taken to reduce administrative costs and time to procure items are exemplified by the following:

We suggested and supported legislation that raised the ceiling for the use of simplified small purchase procedures from $10,000 to $25,000.

We have adopted a policy to encourage the use and procurement of commercial type products.

We have initiated a program to simplify and shorten contractual documents.

We ae using automatic data processing equipment (ADPE) wherever practical in the processing of small purchase orders.

Bidder's mailing lists are computerized.

ADPE and other innovative equipment are used in the preparation and reproduction of solicitation and contract documents.

Specifications are being simplified and industry standards used when feasible.

Comprehensive training courses are being conducted.

Question. Have these steps had any impact on audit procedures or major contract reviews? What specific reviews have been eliminated?

Answer. None of the audit procedures or major contract reviews have been changed as a result of our Acquisition Improvement Program

Question. Reduction in paperwork can be achieved, but not necessarily at the expense of eliminating needed reviews. What is DoD doing to assure necessary reviews and audits are being continued?

Answer. As previously stated, none of the audit procedures or major contract reviews have been changed as a result of our Acquisition Improvement Program. If in the future consideration is given to any possible changes, the final decision will be based on an evaluation to determine that the changes would be cost beneficial to the Government.

PROCUREMENT CONSOLIDATION

Question. The Investigative Staff study has questioned some areas which indicate additional management review is needed. Let me cite one for the record. DoD has failed to consolidate and/or coordinate procurement items: Four contracts for rotary wing head weights were issued during a 5-month periods as follows:

Date of award	Quantity	Unit price
November 6, 1980	475	$20.56
December 12, 1980	571	21.55
April 3, 1981	1,436	17.55
April 10, 1981	30	52.50

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Why couldn't all these contracts have been combined?

Answer. It is our policy to procure items in sufficient quantities as to preclude repetitive procurements of the same items within short time periods. However, unexpected requirements may develop to require additional quantities. If the initial awards have not been made, the new quantities should be added to the original solicitation.

In the cited case, it would appear that the 4/10/81 buy of 30 should have been added to the 4/3/81 buy. Perhaps the first two buys could have been combined. However, the award dates indicate that all four buys could not have been combined. If the inventory control activity had some forewarning about the unexpected increased usage, additional quantities could have been bought initially.

Question. Has DoD had a chance to look into this situation and make corrections where necessary? If so, what has specifically been done to correct future problems in this area?

Answer. We believe that our policies adequately cover this area. The problem lies with the unexpected requirements that develop from time to time. The problem cannot be completely eliminated, Inventory control and purchasing activities try to minimize the problem by better forecasting, adding new requirements until the next periodic buy.

THRESHOLDS ON AUDITABLE DATA OR CONTRACTS

Question. GAO questioned DoD's proposal to increase the minimum threshold cost from $100K to $500K under which contractors are required to submit auditable data on contracts for DoD audit. GAO said it could find no evidence to support DoD's claim that raising the threshold will relieve DoD or contractors of a costly burden. Further, it could invite overpricing and reduce DoD's ability to make preaward audits.

What is DoD's response to the GAO claims?

Answer. When contractors submit certified cost or pricing data they must, of necessity, review and update their proposals at the time of negotiations. This procedure is time consuming and costly and is paid for by the Government through the allocation of this indirect cost to our contracts. Increasing the threshold from $100,000 to $500,000 for the submission of certified data will eliminate the need for these reviews in connection with a substantial number of proposals and there by result in a reduction of administrative cost. In connection with our ability to make preaward audits, the change in the threshold has no effect. We can and will require contractors to furnish cost or pricing data in connection with proposals under $500,000 when, in our judgment, it is necessary just like we have required the submission of data on proposals under $100,000 before the threshold was changed. In addition, contract negotiators will obtain audit assistance on these proposals as required.

In our opinion, as a result of our experience over the past 20 years and the improvements in contractor estimating systems resulting from DCAA audits, we are less likely to experience overpricing under the revised threshold than we were 20 years ago under the original threshold.

PROGRAM STABILITY

Question. Deputy Secretary Carlucci testified on October 17, 1981, that he requested the Services to identify stable programs which would then enable OSD "to establish a consolidated list of about 30 major programs," and in an attempt to stabilize them "make a management commitment to provide stable funding."

Give us your interpretation or definition of program stability.

Answer. Program stability in this context refers to the degree to which funding is provided in support of an approved development schedule and production profile designed to meet a firm inventory requirement. Program instability (stops, starts, and stretchouts) occurs when funding is insufficient to maintain the approved program inventory requirement.

Question. When specifically did you request this information from the Services?

Answer. The request for an initial list of Service candidates was made by memorandum on 31 July 1981.

Question. What method will be used to establish program priorities for identifying those programs that will be established? Will the criteria be constant for all four Services?

Answer. A consistent set of criteria for selection of candidates for the Stable Programs List has been agreed upon by Service and OSD representatives. Program candidates must be essential to high priority missions and must be low risk, DSARC level programs which are already in production.

Question. Give the Committee a few examples of the programs you have made a commitment to stabilize and provide a detailed list for the record.

Answer. The Stable Programs List has not yet received full coordination. The Services, however, have submitted a combined list of 20 candidate programs as part of this year's Program Objective Memoranda (POM) submission. Since the candidates must be reviewed in full before final DepSecDef approval, release of the preliminary list of candidates is not appropriate at this time.

Question. Has there been any indication of improved weapon system program stability as a result of the initiatives, and if so, give some examples of the programs. The initiatives involved, and the benefits achieved?

Answer. Improvements in program stability due to DoD Acquisition Improvement Program initiatives will require time in order to assess our progress. In fact, this year's budget preparation and review process marks the first time the new management philosophy has been fully integrated into the PPBS process from start to finish. Important steps have been taken which will improve program stability.

Policy guidance on improving program stability has been issued to the Sevices. The requirement for the Services to nominate candi-

dates to the Stable Programs List was incorporated into the Program Objective Memoranda (POM) Instruction book. In addition, special management attention is being placed on program stability as part of this year's program budget review.

Question. What actions have been taken, if any, to promote program stability for programs which have not been set aside for special management? Give us some examples.

OSD Answer. Stabilization of programs which are not of sufficient magnitude to warrant special management attention by the Office of the Secretary of Defense is an important part of the DoD management initiative to improve program stability. Greater stability for such programs hinges largely upon the reliability and accuracy of program cost estimates and better estimates of inflation. Several important initiatives have been taken to achieve these objectives.

Much of the instability/affordability problem has resulted from the impact which unpredicted inflation has on a program. In the past, program cost estimates included the application of general economic inflation indices rather than indices which were applicable to a particular sector of the economy. Since over the past several years, inflation for defense programs has run higher than the predicted, general level of inflation, the affordability problem for all defense programs has become more acute. In an attempt to distribute the burden, increased program instability has been the result. The fiscal year 1983 Defense Budget has incorporated an important remedy for this problem by applying to programs inflation indices which represent historical inflation experienced by defense industry according to sector. The result will be more realistic program cost estimates which must be fully funded in accordance with DepSecDef direction.

In addition, guidance has been issued to the Services to budget for technological risk in an attempt to reduce or avoid unforeseen costs which arise from technical problems. In fiscal year 1983, for example, the Army applied $87.1 million in RDT&E funding to twelve programs to provide for technological uncertainty.

To the degree that these and other methods of improving cost estimating are successful, the likelihood of reducing program instability is increased. This approach to improving stability in general also will enable OSD and Service staffs to avoid inefficient and unnecessary interference in program management. As with major programs, however, time will be required before real progress can be made.

Army answer. Improved program stability of Army materiel acquisition programs is being made possible through the implementation of the Program management Control System (PMCS). One of the primary objectives of PMCS is to promote program stability through the formalization of program change procedures and the basing of change decisions on a total impact assessment. A total of 36 programs are in addition to the four Army programs contained in the OSD consolidated list of about 30 specifically designated for stabilization.

Examples of systems being brought under PMCS are the Multiple Launch Rocket System (MLRS), the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), and HELLFIRE.

Navy Answer. The majority of Navy programs are not identified for "special management". All programs, including those identified for special management, are prioritized and the resulting list used to ensure stability for highest priority programs. Fluctuations in the budget will be reflected in the prioritized program listing by vertical rather than horizontal cuts. In these cases, the lowest priority programs are eliminated in favor of stable funding for those of higher priority. Some examples of vertical cuts which have been taken in furtherance of program stability are as follows

63518N Advanced Navigation Development
63569N Follow-on SSN
63358N Weaponizing Prototyping
63381N Integrated Fire Support Coordination
24134N A6/AWSAC
63202N Advanced Aircraft Electrical Systems
63203N NAVTO Land
63254N Advanced Lightweight Helo Sonar
63313N IIR HARPOON
64701N PCOTES
11403N HYDRUS

Air Force Answer. Air Force Systems Command incorporates a tier system made up of of three major types of reviews.

The first and top tier is the Program Assessment Review-Secretary of the Air Force Program Review (PAR/SPR). The PAR portion is given at HQ AFSC and material of command-specific interest is included—in addition to the material that will go forward as the SPR. The SPR portion is given to the Air Force Council and the Vice Chief of Staff and then to the Secretary of the Air Force.

The second tier is the Command Assessment Review (CAR) which is presented at HQ AFSC and is made up of those programs that collectively use a significant portion of AFSC's resources but are not reviewed by the PAR/SPR system.

The third and last type of reviews are the Field Level Reviews which are presented at all levels of the AFSC field level Commands and include all programs.

All the reviews discussed above are designed to improve and promote program stability by providing management with program visibility, identify and define problems, and present essential facts and information necessary for decision making.

ECONOMIC PRODUCTION RATES

Question. The proposed Sec/Def hit list also includes a $200 million reduction to "cap" M1 production at 60 per month. What is the economic production rate for the M1?

Answer. Based on the current facilitization, production estimates from contractors, and economic lot quantities the most economic production rate for the M1 is 90 per month.

Question. Why was this reduction proposed by the Army and agreed to by OSD?

Answer. This reduction was not proposed by the Army. It was a top-down affordability cut to meet reduced Defense Appropriation guidance. This proposed cut is still being analyzed to determine

how to best implement with least impact to the program. It will, however, have these real or potential impacts:

The cut will eliminate the $80.6 million programed for second source fire control.

The remainder of the cut will impact tank procurement and associated spares.

Using fiscal year 1982, when 665 tanks were funded, as a base, the cut has these impacts:

Slows planned production ramp-up toward 90 tanks a month.

Will cause us to buy fewer than the 776 tanks now programed.

Further cuts must be avoided to keep the 90 a month higher rate production target within reach.

Question. The Army's DIVAD gun system was designed for an economic production rate of 12 per month. However, because insufficient funds are available for procurement, the economic production rate will not be reached until the last year of production. By then, two-thirds of the DIVAD will have been produced.

A. Why was the Army allowed to violate one of the Carlucci initiatives?

B. Why were the competing contractors told to facilitize for a production rate which could not be achieved because of affordability?

C. Does this action by the Army indicate that DIVAD is a lower priority program and should be considered for termination?

Answer. A. The production rate for DIVAD Gun was determined prior to the Carlucci initiatives being developed. The production rate for DIVAD ramps from a first month production of 2 systems up to an eventual maximum rate of 12 per month. The ramp rate was well thought through by all members of the force modernization team and the present production and deployment schedule were deemed to optimize successful fielding of the DIVAD system.

B. Although, the maximum production rate is achieved in only one year (1986), the facility that is being built for DIVAD will produce at almost maximum rate beginning in 1984. This ramp rate took into consideration not only production capacity but also training and supportability.

C. This DIVAD gun production schedule is well thought out and totally executable. This program is completely supported by the Army and absolutely should not be considered for termination.

TERMINATION OF PROCUREMENT PROGRAMS

Question. Secretary Carlucci stated last October "That some program must be eliminated to make room and achieve stability for others." Cite some examples of major procurement programs that you have eliminated and provide a detailed list for the record.

A. What process did DoD use to determine which programs should be terminated?

B. What has DoD done to assure itself that these efforts are not being funded under other programs?

C. Are additional programs being reviewed, and can we expect further major program terminations to be announced before the end of fiscal year 1982? In the fiscal year 1984 budget?

Answer: DoD preparation of the FY 1983 budget resulted in termination or reduction of a substantial number of programs and systems, including several major programs. Among those major programs were IIR Harpoon, VLS ASROC, Fire-and-Forget Hellfire, Roland, and JP-233 Airfield Attack Munitions. Detailed figures for these programs are as follows:

	TOA $ Millions Saved						
	FY 82	FY 83	FY 84	FY 85	FY 86	FY 87	Total
IIR Harpoon	38.6	39.8	32.1	23.1	3.6	3.8	141.0
VLS ASROC	15.3	27.6	20.4	12.7	0.5	0.5	77.0
F&F Hellfire.....	27.7	61.0	83.1	74.4	25.5		271.7
Roland	14.4	11.3	9.3	1.0	1.0		37.0
JP-233	60.0	38.9	12.3				111.2

More detail on additional program terminations and reductions was previously provided in the March 29, 1982, summary of FY 1983 DoD Economies and Efficiencies.

A. The process which produces the DoD budget also produces program termination decisions. Program cancellations are built into the Planning, Programming, and Budgeting System (PPBS). The preparation of the Program Objective Memoranda (POMs) by the Services leads to the majority of program cancellations, as Services balance resource constraints with program priorities. Further consideration of possible program cancellations takes place during both the DoD Program Review of the POMs and the Budget Review of the Office of Secretary of Defense (OSD).

B. The PPBS process also assures that cancelled programs will not be funded through other programs, unless a conscious decision to do so is made by the same decision makers who cancelled the program. The existence of specific threats, however, are not eliminated through program cancellations. New or modified programs may arise to meet those threats.

C. During the DoD preparation of the FY 1984 budget, additional programs will be considered for cancellation. Cancellations will be listed and described in testimony accompanying the FY 1984 budget, but no list of FY 84 terminations will be available prior to the budget submission.

BUDGETING TO MOST LIKELY COSTS

Question. Initiative number 6 is "Budget To Most Likely Cost". The study panel's recommendation, to the Deputy Secretary of Defense, stated as follows regarding this issue:

"Program costs are sometimes purposely understated to fit available funding rather than the funding it takes to do the job."

This practice is referred to as a "buy in."

How will the OSD determine when estimated program costs have been deliberately understated?

Answer. The goal of this initiative is to program to the Department's best estimate of the weapon systems cost to ensure that a quality product is fielded on schedule in the quantities desired. That requires proper cost estimating reflecting accurate inflation projections, attainable production learning curves, complete understanding of technical complexity, and optimum contracting strategy. The understatement of program cost is revealed by independent cost estimates; should cost studies, development cost experience, and comparison with weapon systems using similar technology.

INFLATION ASSUMPTION

Question. What assumptions are made by OSD in determining its estimates for inflation rates in the "out years?"

Do you use OMB's assumptions?

If not, how do your inflation assumptions differ from OMB?

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Answer. The Assistant Secretary of Defense (Comptroller) provides inflation assumptions to the Military Departments and Defense Agencies based upon OMB guidance. Prior to the fiscal year 1983 budget, the Gross National Product (GNP) implicit price deflator was used, consistent with the respective Administration's overall economic assumptions

There were several distinct problems in using the GNP deflator to project future inflation in the DoD budget. First, Defense price experience over the past ten years, has been calculated by the U.S. Department of Commerce to be higher than price increases recorded in the general economy. Second, defense systems are affected by general and certain economic factors peculiar to defense. Finally, the long lead times, for major weapon systems, cause the optimistic estimate for future inflation rates to be more critical to DoD than to other agencies.

For these reasons, DoD and OMB reached an agreement to price the fiscal year 1983 Defense budget, and its five-year forecast, more directly on economic events affecting those industries actually providing military goods and services. The acquisition programs are budgeted to most likely cost. DoD will continue to work with OMB and the Department of Commerce to ensure realistic budgeting for inflation.

Question. Initiative 6 recommends that "Incentives for acquisition officers and industry to make and use realistic cost estimates . . . " should be provided.

What incentives have been provided to achieve this objective?

Answer. Cost management will be a factor in determining eligibility for promotion and decorations for military program managers. For civilian program managers, part of their merit pay or bonuses will be determined based upon how well they manage program costs. Adequate cost control by contractors will receive increasing emphasis in award fee determinations under applicable contractual award fee provisions and will also receive increasing emphasis as a past performance factor to be used in future source selections.

Question. What specific programs received additional funds in fiscal year 1983 under this initiative?

Answer. The following programs are representative of the increases necessary in fiscal year 1983 to procure the quantities previously planned. Many millions more were added to a multitude of less significant programs to finance inflationary increases and repricing.

Budget to most likely cost

Fiscal year 1983 TOA Increase:	*Millions*
AH-64 Attack Helicopters	$210
UH-60 Helicopters	40
STINGER Missiles	30
PATRIOT Missiles	127
TOW Missiles	45
PERSHING Missiles	32
M-1 Tanks	310
F-14 Aircraft	60
F-18 Aircraft	250
CH-53E Helicopters	40

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SH-60B Helicopters	104
P-3C Aircraft	16
E-2C Aircraft	89
SPARROW Missiles	32
PHOENIX Missiles	106
HARPOON Missiles	44
HARM Missiles	41
STANDARD Missiles	64
F-15 Aircraft	84
F-16 Aircraft	181
ALCM Missiles	25
GLCM Missiles	50
Total	1,980

Improving System Support and Readiness

Question. Another Carlucci initiative established readiness objectives for such development program to include estimates of the readiness level to be achieved at early fielding and at maturity. A Secretary of Defense policy was to be drafted tasking the Services to develop implementing guidelines, including procedures for addressing support early in the acquisition program.

Has the Secretary of Defense policy been issued? If so, Provide a copy for the record.

Answer. Yes. The Deputy Secretary of Defense signed a memorandum June 13, 1981 tasking the Services to develop implementing guidelines. A copy is provided for the record.

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THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

JUN 13 1981

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS

SUBJECT: Readiness and Sustainability in Acquisition Programs

This memorandum provides additional guidance to carry out my direction on improving the DoD acquisition process. These improvements require comprehensive changes to the way we achieve readiness in our development programs. These changes will require coordinated efforts by the operators, the developers, and the support community. As stated in my April 30, 1981 memorandum, Recommendation 1, "Improved readiness is a primary objective of the acquisition process of comparable importance to reduced unit cost or reduced acquisition time. Resources to achieve readiness will receive the same emphasis as those required to achieve schedule or performance objectives. Include from the start of weapon system programs designed in reliability and maintainability (R&M) and support."

In approving Recommendation 9 (Improve Support and Readiness), I reaffirmed the new policy emphasis on readiness and support as contained in the recent acquisition directives and reaffirmed the priority of implementing these policies. It is my objective to have Service implementing procedures in operation within a year. Specific guidance on tasks to be undertaken by the Military Departments follows. These tasks will be supplemented by other follow-up actions to my 30 April memorandum involving such elements as contractor incentives, logistic R&D, and program manager incentives.

A. Readiness Goals as Design Objectives

For each acquisition program, readiness goals to be achieved at early fielding and at maturity will be established early in development and used as a principal management tool. For major programs, the approach to achieving these goals must be included in the acquisition strategy with explicit planning and resources to achieve them. Readiness goals will be defined in such a way that they can be quantitatively related to measurable hardware R&M characteristics, and to manpower and logistic resource requirements (spares, test equipment, etc.). Both peacetime and wartime goals should be included (e.g., operational availability, sortie rate, percent coverage). Each Service will develop procedures for the assignment of readiness goals, review the current acquisition programs, and assign readiness goals to each program for use as support planning targets.

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B. Guidelines for Additional Front-End Funding and Attention for Concurrent Development Programs

I have assigned high priority to the objective of shortening the overall time to deliver equipment to the troops which will meet mission and readiness needs. This will require additional front-end funding and special attention to reliability, maintainability, and support requirements for programs characterized as concurrent. As a matter of priority, each Service will institute guidelines and procedures for accomplishing these actions on all concurrent programs to reduce the risk to achieve the established readiness objectives in the face of the shorter development cycle. In the near term, the Services will identify programs now in development that are selected for special attention, and develop requirements for the R&D and procurement resources to achieve system readiness goals. It is our intention to support these additional requirements throughout the program and budget development process and to ensure that the resources will be used for the purpose intended.

C. Programs for Support Emphasis

Some new development programs offer a potential for the application of technology to achieve substantial improvement in readiness or improvement in deployability and sustainability under relatively austere conditions. Each Service will review mission needs and designate programs for which such improvements will be primary objectives.

D. Organization and Procedures to Implement the Policies

Finally, each Military Department will conduct a thorough review of our policies and recent decisions on the acquisition process and identify the organizational responsibilities, procedures, and analysis capabilities planned to make both the material and manpower components of readiness and sustainability an integral part of all new acquisitions. Of particular importance in addition to improved planning, is the approach to evaluation of readiness and sustainability in both development and operational testing.

I have asked the USD(R&E) and the ASD(MRA&L) to work jointly with the Services on implementing these tasks, and in particular to identify funding or other resource needs and to see that these are supported. Please provide me, within 45 days, your timetable for accomplishing these tasks. This timetable should include an initial briefing on your organization and procedures in the next 2-3 months.

Frank C. Carlucci

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Question. Have the Services fully complied with the Secretary's directive?

Answer. Yes. All three Services have taken steps to assign readiness thresholds and goals for major new systems undergoing DSARC reviews. The Navy has issued an instruction (NAVMATINST 300.2) to formalize definitions and procedures. The Army and Air Force plan to have implementing procedures completed this summer.

Question. Let me discuss two major systems being delivered today that may encounter support problems in the future. First, GAO reported in February of this year the delays and deferrals of test equipment may affect aircraft operation and support of the F-18. Technical, schedule, and cost problems along with revised requirements have in fact affected test equipment, and trainers for the F-18. What is OSD doing to ensure that this aircraft will maintain its required operational availability and be properly supported?

Answer. A/A-18 support requirements and operational availability analyses have been explicitly considered at each F-18 DSARC milestone and Program Review over the past three years. Resources were added during the fiscal year 1983 OSD budget review to correct shortfalls in F-18 test equipment funding. Special OSD management attention is being given to F/A-18 initial support requirements during the current POM review.

Question. If these delays continue, will this not increse the requirement for spares?

Answer. Yes. Delays in test equipment and test program set (TPS) development have already caused a near term increase in the requirement for pipeline spares. The Navy has programmed the additional spares funding required. Further delays are not expected, and as test equipment and TPS 's are delivered the "extra" spares will be used to support follow-on site outfittings.

Question. With respect to the M-1 tank, is the spares and repair parts program for the M-1 tank fully funded for the FYDP?

Answer. Yes. Based on information currently available M-1 tank spares are fully funded through the FYDP.

Question. Under existing guidelines, replenishment spares should be requested after a system has been in procurement for about 2 years. Does the FYDP plans call for fully funding replenishment spares for major Army systems like the M-1, M-2, DIVAD, AH-64, Patriot, and MLRS? For the above-mentioned systems, does the fiscal year 1983 request represent a fully funded program for spares?

Answer. It is policy to retain items in the initial spares line during the Demand Development Period (DDP). The DDP is that period of time extending from the date of initial operating capability (IOC) to a point in time, usually two years beyond the IOC date, when requirements are forecasted based on actual demands. None of the systems mentioned above are currently two years past IOC. The M-1 and MLRS are scheduled to transition from initial spares to replenishment spares during the FYDP period. Replenishment spares are fully funded for these systems. The AH-64, M-2, DIVAD and Patriot are carried in initial spares throughout the FYDP. Action has been taken to transfer these systems to replenishment

spares support with plans to fully fund the requirements. The latest FYDP update reflects these transfers.

Spares programs for the above-mentioned systems are fully funded in fiscal year 1983.

Management Reserves for Technological Risk

Question. Carlucci initiative number 11 recommends that the Department incorporate the use of budgeted funds for technological risk. A. How much money was requested in fiscal year 1983 for this purpose? How many systems did this include? B. Explain OSD's review of the Services request for these funds? C. Explain how you quantified "uncertainties" and "risk"?

Answer. A. $87.1 million is requested in fiscal year 1983 for 12 systems. B. As with all service/agency budget requests the OSD staff analyzed the data to see if there would be a fair return of the investment; i.e. would the spending of these funds serve to significantly reduce the risk of design problems that might adversely effect early production or subsequent operation of the systems. These 12 systems were approved on the basis that the technological risk would be greatly reduced. C. Depending on the status of the development program for a given system, it is often prudent to make changes to the evolving design in order to either avoid technical problems from arising later or to facilitate more economical production techniques. Both of these types of efforts will serve to provide a better piece of equipment to the user in the field. Therefore, by budgeting relatively small amounts for "technology risk" early in a program, long term benefits derive.

Question. Provide a complete breakout of the funding being requested for "risk" by Service and by appropriation?

All of the projects requested for FY 1983 are included in the Army's RDT&E account and are as follows:

TABLE 1
BUDGET FOR TECHNOLOGY RISK
($ in Millions)

System	Total FY 1983 RDT&E Amount	Amount Included for Risk
COBRA TOW Missile	12.2	1.0
Army Helicopter Improvement Program	75.8	11.1
PATRIOT Missile	27.5	5.8
HELLFIRE Missile	19.3	12.0
PERSHING II Missile	111.3	29.3
M-1 Tank Gun	31.6	5.6
Tactical Communication	7.9	1.8
MICNS Data Link	14.8	3.5
Position Location Reporting System	9.4	0.5
Remotely Piloted Vehicles	73.2	14.4
NAVSTAR Satellite Ground Equipment	11.9	1.0
Tactical Satellite Communications System	17.5	1.1
Total	412.4	87.1

NOTE: Amounts included in the right-hand column represent resources required to meet estimated technological risk for these programs.

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TOTAL RISK ASSESSING COST ESTIMATE (TRACE)

Question. The Army has initiated, and Congress has accepted, a Total Risk Assessing Cost Estimate (TRACE) to explicitly address the program uncertainties. How long did it take the Army to develop and implement the TRACE system?

Answer. In the interest of cost realism, the Assistant Secretary of the Army (Research and Development) first proposed on 12 July 1974 that a Total Risk Assessing Cost Estimate (TRACE) be generated for all future RDTE development programs. A statement on Realistic Cost Estimating (including the TRACE concept) was presented to the Senate Armed Services Committee on 27 February 1975. Department of the Army letter of instruction, implementing the TRACE concept was issued 6 March 1975.

Question. The Carlucci initiatives stated that the other Services lacked a similar concept to justify reserve funds. Are the Navy and Air Force requesting funds for this purpose?

Answer. The Navy has budgeted funds in a limited number of fiscal year 1983 procurement and RDT&E programs for technological risk reserves.

The Air Force completed its evaluation of the Army TRACE concept and determined that the Air Force current methodology achieves the same results. Although the Air Force fiscal year 1983 request does not specifically identify funds to cover program uncertainties, the Air Force budgeting process does take them into account.

Question. The Carlucci statement reads: "The Army is studying the application of this concept to early production cost estimates." How long has this study been underway, and when will it be completed?

Answer. A Total Risk Assessment Cost Estimating for Production (TRACE-P) study began in June 1981 and was completed in January 1982. The study was conducted by the Army Logistics Management Center and Army Procurement Research office. Study results were presented to the Commanding General, U.S. Army Materiel Development and Readiness Command on 1 February 1982 and to the Under Secretary of the Army on 8 June 1982. An initial program request for the XM833 projectile under the TRACE-P concept is being considered in the fiscal year 1984 budget cycle.

Question. The Navy we understand is requesting reserve funds for programs that have been in production for a number of years. Why did OSD allow this to happen, particularly since the Navy lacked a system comparable to Army's TRACE system before this year's budgeting for uncertainties and risk began?

Answer. In our ongoing review of the fiscal year 1984-88 service/agency budget requests, we are looking into a Navy proposal to fund a select group of NAVELEX programs under the "technology risk" initiative. No decisions have been reached and therefore their appropriateness has not been determined. The Navy is proposing a TRACE-like management system and plans to expand its application to other program areas in future years.

Question. Since the TRACE system primarily addreses uncertainties in R&D programs, how many Navy R&D programs have reserves funds requested as compared to procurement programs?

Answer. NAVAIR plans to implement TRACE on a test basis for 6 R&D programs (AV-8B, S-3 WSIP, ASPJ, AIM-54C, AIM-9M and AN/ALQ-149).

Question. One of the disadvantages stated that budgeting for technological risk "Can encourage more costly treatment of problems that might be solved in other ways (self-fulfilling prophecy)." What specific oversight has OSD established with respect to monitoring/evaluating the use of these funds?

Answer. As with many of the management initiatives, a special review group has been established to analyze annual progress on implementing the "budgeting for technological risk" program. The group assesses the value of ongoing efforts already approved by Congress and the new proposals submitted by the Services. This POM review is, of course, in addition to the traditional annual review of all programs that is performed each fall by the ASD Comptroller staff.

Question. In approving this initiative the Secretary of Defense emphasized the requirement to evaluate, quantify and plan for risk. Following that, each Service was directed to review the TRACE system and either adopt it or propose and alternative system for their use within 60 days.

Did the Navy and Air Force adopt the TRACE system?

Answer. The Navy has reviewed the Army's TRACE concept and has implemented a similar system in the Naval Air Systems Command for selected development programs. Requirements for reserve funds for these programs have been estimated, and these funds will be requested in the fiscal year 1984 budget. The Air Force completed its evaluation of the Army TRACE concept and determined that the Air Force current methodology achieves the same results.

Question. Considering the number of systems involved and the requirement to evaluate, quantify and plan for risk, how did OSD expect the Services to provide budget quality estimates with 60 days?

Answer. Again, as with many of the initiatives, the idea of budgeting for risk is not new nor is the Army's very successful TRACE concept. Emphasis has been added by this administration. Since the Services were involved in the formulation of the initiatives, their capability to implement them was a joint commitment with OSD. All Services were able to indicate their plans within the 60 days, and the budget quality details followed at a reasonable date.

Question. To what extent did OSD review the initial budget requests to determine whether reserves were already included in those requests?

Answer. Both the initiatives oversight review group and the ASD Comptroller staff made recommendations to DepSecDef covering the technological risk funds proposed by the Services. There were no duplicative amounts submitted to Congress, only enough funds to reduce the risk in selected R&D programs.

IMPLEMENTING THE CARLUCCI INITIATIVES

Question. Deputy Secretary Carlucci assigned responsibilities for implementing his directives to Under Secretary DeLauer. There were to be monthly progress reports beginning May 1981 and ex-

tending "until further notice." Are these reports still being received on a monthly basis?

Answer. The Acquisition Improvement Steering Group, consisting of 16 OSD and Service officials at the Deputy Assistant Secretary/three-star level was designated as the oversight body for the Initiatives in January 1982 by Secretary Carlucci. This Group has six working groups which meet at the two-star/Senior Executive Service level and which submit regular reports to the parent body. In many cases these are monthly. Each working group writes minutes of its meetings which are circulated to the Steering Group. The Steering Group submitted a major report in December 1981 to the Deputy Secretary and submitted a "one-year" report to him in July 1982, based on progress from April 1981 to May 1982.

Question. What did the last report say about the progress in implementing the directives?

Answer. A copy of the July report is attached for your information. This is the "year-end" summary of our progress based on the passage of one year since Secretary Carlucci initiated the Acquisition Improvement Program.

THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

July 15, 1982

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Year-End Report on the Acquisition Improvement Program

Attached for your information and appropriate action is a copy of a year-end report on the progress of the Acquisition Improvement Program. It is clear that more progress has been made since the last review in December 1981, but it is also clear that we have some way to go before the 32 Initiatives have become part of the daily way of doing business in the Department of Defense.

With this in mind, I think that the next six months should be dedicated to a two-pronged approach: first, we must emphasize pushing down the policies that we have developed to the working level in each Service; and second, we must ensure that management decisions at the top level demonstrably reflect the policies and principles of the Initiatives.

During my last meeting with the Joint Logistics Commanders, we discussed the Acquisition Improvement Program. That discussion was meant to emphasize the necessity of getting the Initiatives down to the appropriate decision-making level in each case, and to ensure that the principles of the program permeate the buying commands. Ultimate responsibility for implementation by the Services, of course, rests with the Service Secretaries. As a result of this discussion, the JLCs appointed a flag-level committee to oversee implementation of the Initiatives in the buying commands.

I expect this group to work closely with the DoD Acquisition Improvement Steering Group. The JLCs will also provide status reports with increased quantification to identify actions taken and results achieved. Further, they will work with the OSD staff to develop an early warning system that identifies acquisition problems.

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In his transmittal letter to this Report, the Under Secretary for Research and Engineering stated his intention to ensure that the Initiatives are reflected in decision-making at the Defense Resources Board based on Issue Book Eight. I will personally join this effort, and expect all of my senior executives to do likewise.

Frank C. Carlucci

Enclosure

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OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

29 JUN 1982

MEMORANDUM FOR THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

SUBJECT: Report of the Acquisition Improvement Steering Group

EXECUTIVE SUMMARY

In his memorandum of April 30, 1982, the Deputy Secretary of Defense asked for a frank and realistic year-end evaluation of our progress, and for suggestions for appropriate action to overcome obstacles to implementation. As was true six months ago, considerable effort has been expended and further meaningful progress has been achieved in the second half of the year. In some areas our accomplishments have been less than we would like. Although the following brief summary attempts to reflect the general state of the Acquisition Improvement Program, our successes (and those that we are still working to achieve) are best demonstrated by specifics in the body of the report.

- Many of the Initiatives are tied to the concept of Program Stability. If viewed solely in the sense of a changing top line, it would be easy to conclude that nothing can be done. The Steering Group recognizes that, for various political realities, the top line will continue to change, and is, therefore, seeking ways to minimize the impact of topline instability on major programs through such vehicles as avoiding unaffordable new starts and the internal discipline to make complete program cancellations rather than stretchouts.

- Multiyear Contracting got off to a strong start with the inclusion of several candidate programs in the FY 82 and FY 83 budgets. There continues the perception that our funding policy diverts Total Obligational Authority (TOA) from other programs and, accordingly, full exploitation of this technique is somewhat hindered. A possible change would be to identify separately that part of TOA required to fund the recurring cancellation liability for Economic Order Quantities (EOQs) associated with multiyear procurement. The aggregated total of these amounts would be included in the budget separate from and in addition to programmatic TOA. A variant on this concept would create a revolving fund of fixed value for the purpose of meeting any government financial obligations related to cancellation. Over time we might work toward an actuarially-determined value for the fund because there is little expectation of its actual use.

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- Preplanned Product Improvement has made increasing progress, but like multiyear contracting can only be applied to a finite number of candidate systems at one time. The Defense Systems Acquisition Review Council (DSARC) remains the primary vehicle for consideration of P3I applications in specific programs, and there are numerous examples of recent major decision meetings and memoranda which have actively considered P3I. Additional consideration will be given as these programs are reviewed at future milestones. In addition, the FY 84 Program Objective Memoranda (POM) submissions identified 26 programs to which P3I concepts had been applied.

- Most of the original actions recommended by the Acquisition Improvement Task Force in December have been completed in the Cost Growth area. The remainder are near completion. Measurement of results will be possible only in the future. The Steering Group feels, however, that more work can be done in the field of incentivizing cost savings and cost reductions "before" a cost growth problem occurs on a particular system. Cost growth is best controlled before it happens - after it afflicts a system, we can only measure the impact and attempt to limit it. For this reason, the Steering Group will shift focus in the next six months toward incentive issues in the Cost Growth area.

- The Support and Readiness area has been one of the principal beneficiaries of the Acquisition Improvement Program. Long-term implementation is occuring through DoD policy directives, and through enhanced Service organizations and procedures. It will take another year, however, before we see the results in acquisition programs structured from the ground up to include the support and readiness initiatives. In the short-term, the initiatives are being followed-up through the DSARC and the Planning, Programming and Budgeting System (PPBS) processes.

- Implementation plans from the Services and the Defense Agencies for enhanced Competition are positive, and underway at this time. In addition, the working group has several major studies underway. A Defense Acquisition Regulations (DAR) Council action and Logistics Management Institute study are in process. Further, the Steering Group is beginning to look at the whole issue of incentives to contractors as an element of competition, as opposed to a strict statistical view. Better reporting methods that indicate the intent of actions taken are also under study.

- Progress has been made in most of the "independent areas" such as DSARC requirements, and MENS (Mission Element Needs Statement) in the POM. We have had good Congressional support for legislative initiatives. We are currently conducting a test program to simplify solicitations and contractual documents for

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programs under $500,000. The revised major system acquisition directive which reflects the acquisition improvement policy decisions, incorporates mission need justification in the POM, and restructures the DSARC and its review process, was issued in March 1982. However, some disagreement has developed over major system acquisition procedures. DoD Instruction 5000.2 has been at a virtual standstill for the past several months - notwithstanding the importance the Task Force attached to it throughout the December report. The disagreement relates to the conflict between the need to reduce DSARC briefing and data requirements, and the need for additional data to demonstrate compliance with the new requirements. Current Service concerns also involve the degree of management guidance prudent to provide to program managers to explain implementation of the Initiatives, as opposed to the idea that such guidance itself runs counter to the "streamlining and decentralization" aspects of the Acquisition Improvement Program.

While impatient for improvements, we recognize that cultural change in a vast organization takes some time. Our challenge is to incorporate the Initiatives in the day-to-day operations and decision processes of the Department. This requires publicizing the Initiatives to ensure a clear understanding at all levels, as well as overcoming the normal organizational resistance to change.

We will keep the Steering Group, with its current composition, moving forward at a brisk pace. As Issue Book Eight of the POM review process is introduced this year, the management issues therein will receive enhanced visibility in the Services through their membership on the Acquisition Steering Group - which is working closely with the Plans and Development Office in the Office of the Under Secretary for Research and Engineering in its role as coordinator of Issue Book Eight.

During the next six months, our central theme will be implementation at the working level. During the first six months, we focused on policy development, and during our second six months on implementation of that policy through such means as directives and instructions. We must now move the new policies down to the appropriate decision-making level for each Initiative. A key mechanism for doing this will be our new relationship with the acquisition commanders in each Service. As a result of the Deputy Secretary's meeting with the Joint Logistics Commanders, a two-star focal point was named in each command. These flag and general officers will provide an overview of activity within each buying command, will assist pushing policy decisions down to the working level, and will serve as liaison with the Steering Group.

These two major new steps, bringing the Initiatives to bear in the POM cycle, and working with the acquisition commanders, should significantly strengthen our ability to ensure that the Acquisition Improvement Program is being implemented as it was designed to be - in our programs.

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HISTORY OF THE ACQUISITION IMPROVEMENT PROGRAM

Shortly after taking office, the Secretary of Defense decided to make major changes both in the weapons acquisition philosophy and in the acquisition process itself. On April 30, 1981, the Deputy Secretary of Defense signed a memorandum that became known as the "32 Initiatives," or the "Acquisition Improvement Program."

On December 23, 1981, a Task Force on Acquisition Improvement submitted a comprehensive review of progress during the first six months of the Program, and an associated implementation plan. In accepting that report, the Deputy Secretary of Defense tasked the permanent Acquisition Improvement Steering Group with oversight of the implementation process and of the implementation plan. The membership of the Steering Group is shown in Exhibit A.

At its first meeting, the Steering Group's primary agenda topic was organization for its new implementation-oriented mission. Six working groups were formed, each chaired by two members of the Steering Group. The working groups focused on the six topical areas identified by the December report as key to implementation of the Acquisition Improvement Program. The working groups and the Initiatives covered by each are listed in Exhibit B.

Action on four of the original Inititatives has been completed. Twenty are assigned to the working groups. The remaining eight are assigned for oversight to specific offices within the Office of the Under Secretary for Research and Engineering.

THE ONE-YEAR ASSESSMENT

Both for comparability with the December (six-month) Report, and because it was determined that working group focus provided the best method for implementation, this report is structured around the work of these six teams. The eight separately-assigned Initiatives are covered at the end.

Program Stability: The ultimate success of the Acquisition Improvement Program depends in large part on our ability to achieve program stability. Until we reach the point that we can better stabilize our major acquisition programs, progress in implementing the other Initiatives and obtaining related economies will be encumbered. Attaining that goal, in turn, requires four major ingredients in DoD's planning and programming:

- Clear and explicit statements of Defense strategy and of the resources currently available and ultimately required to accomplish that strategy, including mission priorities. The Services require this information to structure their programs within fiscal constraints.

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- More stability in the topline fiscal guidance provided to the Military Departments.

- More stability in program cost estimates.

- Starting only programs that we can afford to complete.

The Program Stability working group focused on the first two. The group recognized that some topline instability is a fact of life in a democratic system of government and attempted to focus on optimal resource management within this environment. Specifically, it looked for stabilizing actions, such as avoiding unaffordable new starts despite topline perturbations. To effectively understand program stability requires a review of both strategy and fiscal guidance as provided over the past year.

About a year ago the Services submitted their FY 83 Program Objective Memoranda (POMs). For the most part, the POMs continued the momentum toward the higher, more efficient production rates begun by the Reagan Administration's FY 81-82 Budget Amendment. Planning and programming guidance to the Services had emphasized the need to cancel lower-priority programs in order to provide funding for sustaining these higher rates, particularly in the out-years, where procurement "bow waves" (unrealistically high procurement funding totals) characterized each Service's five-year plan. Several issues were raised in this context during the Summer program review; however, the resulting decisions directed changes in the Service programs rather than outright cancellation of lower-priority programs. The unforeseen budget reduction, directed by the Administration in late summer, increased the difficulty in progressing toward enhanced program stability and more efficient production. Much of the initial unsettling effect of these reductions was eventually repaired before the FY 83 budget was submitted to Congress.

The final FY 83 budget provided a topline which was increased substantially over that which resulted from earlier reductions. Application of the Initiatives was evident in several major areas: more efficient production rates, multiyear procurement, budgeting to most likely cost, major system new starts, and budgeting for technological risk. The FY 83 Congressional budget submission represented a momentous and unprecedented commitment to these management initiatives. DoD had truly "put its money where its mouth was." The fiscal guidance provided in the Spring of 1982 to the Services reduced their FY 84 Total Obligational Authority (TOA) by roughly $2 billion each from projections in the FY 83 budget on which they had based their FY 84 POM development. This reduced funding may well have an impact on some programs.

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Thus, in the space of roughly 14 months, there have been four fluctuations in Service funding: the FY 81-82 Amendment, which added substantial funding and permitted restoration of several major procurements to efficient rates; the FY 82 budget revision, which reduced that funding and stretched out several of these programs; the final FY 83 budget submission, which not only restored the earlier FY 83 cuts but added substantial TOA; and then the FY 84-88 fiscal guidance, which reduced Service enhanced toplines by roughly $2 billion each in FY 84.

While understandable, this kind of activity impedes efforts to fully implement major acquisition initiatives, particularly program stability and economic production rates. The Department has lived with topline instability for years. We are now making a major effort to provide program stability within changing toplines. While working toward this goal, we must recognize the difficulty of achieving perfection in this area. In fact, it might be noted that total inflexibility would not be constructive in a world of changing requirements within a constrained budget. Despite the problems we should focus on achievable results such as avoiding unaffordable new starts and developing a Stable Programs List. As part of the FY 83 program review, OUSDRE attempted to develop such a list. While the Services made a major effort to respond to that initiative, they are reluctant to "fence" major acquisition programs as they attempt to maintain the flexibility to provide a balanced program meeting policy guidance within fiscal limitations.

Final agreement among the Services and OSD on the Stable Programs List has not yet been reached. In the interim, OUSDRE will track and report on DoD major program instability to the Defense Resources Board (DRB) and the Deputy Secretary as a part of the program budget review process. We must also develop internal discipline to effect cancellation of programs or even missions. Without such discipline, this aspect of the Acquisition Improvement Program cannot fully succeed.

As we take these steps toward providing program stability within a changing topline, we must recognize that this is a form of cultural change in the way that we have done business. It will take some time to spread this new way of approaching the problem through the many levels of decision-making in a large organization. We have provided new management tools for use at various levels in the system. It may take a while before they are applied smoothly in the real world.

Multiyear Contracting: Progress has been made in implementing multiyear procurement strategies for our major programs, but we may have opportunities to implement them more effectively in the future.

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The Congress has enacted legislation that allows much larger cancellation ceilings than heretofore possible and permits us to include recurring costs in the ceiling. Each military Service and the Defense Logistics Agency (DLA) have implemented the interim Defense Acquisition Regulation (DAR) provisions and the final subcommittee case should go to the DAR Council by the end of this month.

The educational programs within the Department have included multiyear concepts and procedures in their curricula. The Services and DLA have promulgated the policy and educated their staffs. A tri-Service seminar was held earlier this month, to exchange views and lessons learned on multiyear experiences to date.

All the Services have initiated, or will initiate, several major multiyear procurements in FY 82. Among these are the F-16, C-2A, Black Hawk Airframe, AN/ALQ-136 Radar Jammer, and the TRC 170 Troposcatter Radio. More programs are planned for FY 83 including the CH-53, Multiple Launch Rocket System, Defense Meterological Satellite Program, Black Hawk Engine, A-6E, NAVSTAR GPS, EA-6B, MK-46 Torpedo, KC-10, MULE LASER, NATO SEA SPARROW, and the SM-1 Missile. Funding levels for some of these programs have changed, however, in the FY 84 POM submissions.

Several programs are being considered for a multiyear start in FY 84, but a disincentive has permeated Service planning — the requirement for large amounts of up-front funding, much of which sits idle for long periods of time. Additional Total Obligational Authority (TOA) was provided in FY 83 for this purpose. However, as the Task Force reported in December, the Services perceive that this additional TOA is at the expense of their other valid requirements and question whether this is a viable solution for the long term. Most in the acquisition community continue to believe that without change in the funding policy, full exploitation of this technique will be elusive.

The Steering Group suggests that the OSD staff, with Service assistance, reconsider current multiyear funding policy. There continues the perception that our funding policy diverts TOA from other programs, and, accordingly, full exploitation of this technique is somewhat hindered. A possible change would be to identify separately that part of TOA required to fund the recurring cancellation liability for Economic Order Quantities (EOQs) associated with multiyear procurement. The aggregated total of these amounts would be included in the budget separate from and in addition to programmatic TOA. A variant on this concept would create a revolving fund of fixed value for the purpose of meeting any government financial obligations related to cancellation. Over time we might work toward an actuarially-determined value for the fund because there is little expectation of its actual use.

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Preplanned Product Improvement: Results have been achieved in implementing the Preplanned Product Improvement (P^3I) initiative. The Acquisition Improvement Task Force Report of 23 December 1981, stated that "The Task Force... could not identify a Defense Systems Acquisition Review Council (DSARC) milestone review or program review which has considered a P^3I alternative since initiation of the Acquisition Improvement Program in April. Further, the Task Force could not identify an instance in which a program has been reduced in scope with a view toward future enhancement via a P^3I approach." We can now state that P^3I has become institutionalized as part of the DSARC process. P^3I has actively been considered at various DSARC meetings (and at its Service counterparts) conducted this year.

Both the Defense Guidance and the POM Preparation Instructions (PPI) have emphasized P^3I in POM 84. The Services have responded by identifying the following programs with major system P^3I efforts supporting POM 84:

Army

M 2/3 Fighting Vehicle System improvements, M-1, AH-64, 155 mm Howitzer, TRITAC, UH-60 Black Hawk modifications, Advanced Field Artillery Tactical Data Systems, PATRIOT Air Defense System

Navy

LAMPS, TACTAS, HARM, F/A-18, AV-8B, JTIDS, ASPJ, ALWT, AMRAAM, CAPTOR, DDGX, TRIDENT II, SUBACS

Air Force

B-1B, F-15, F-16, HARM, AMRAAM

We should note that the PPI did not require detailed financial data on the listed programs. But each Service has provided specific P^3I guidance, detailing philosophy, definitions, and procedures, for distribution to program managers and acquisition commands. A number of P^3I studies done recently add to the available academic literature and stimulate the concept among programmers and managers.

In summary, the P^3I effort within the Services and OSD is alive and well. The working group will continue to monitor the effort and strengthen the policy objectives of Initiative #2.

Cost Growth: Most of the original actions recommended by the Task Force have been completed and the remainder are near completion. However, the results of implementation can only be measured by examining the impact of these Initiatives on future cost growth in programs.

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The Initiatives assigned to the Cost Growth working group fall into three basic categories: those which lead to more realistic baseline cost estimates or budgets; those which contribute to DoD's ability to control acquisition costs within the baseline estimates; and, the Initiative on Funding Flexibility.

Within the first category, a major step was taken by the Defense Resources Board (DRB) in November 1981 to implement Budgeting to Most Likely Cost. The DRB decided that the Services should utilize independent cost estimates in development of program budget projections and required the Services to budget either the higher of the independent cost estimate or the program manager's cost estimate, or to explain their rationale.

The DRB direction has been implemented by DepSecDef Memorandum dated May 19, 1982. This new policy will be phased in this year on the following systems:

> Army-DIVAD, FVS, and Pershing II; Air Force - F-15E, F-16E, NAVSTAR, and AMRAAM; Navy-AV-8B, LHD-1, and Phoenix (AIM-54C). Major systems to be covered in the future will be those of interest due to size of program, complexity, uncertainty, or other characteristics that indicate need for special analysis.

The Services are taking other independent actions to improve their ability to Budget to Most Likely Cost. For example, the Army has established a new link between the Planning, Programming and Budgeting System (PPBS) process and the Army Systems Acquisition Review Council (ASARC) process which will ensure that all ASARC decisions affecting program cost are reflected in the PPBS process. Also, the Navy has established a new Program Management Proposal Process (PMPP) to provide high-level visibility of changes to configuration, acquisition strategy, and cost estimates in a manner which will focus attention on potential cost growth early on.

To improve their Budgeting for Technological Risk, the Army and the Navy have implemented a concept known as Total Risk Assessing Cost Estimating (TRACE). This program quantifies risk and budgets funds held at the command or local level to cover the estimated cost associated with the risk. The Air Force uses techniques similar to the Army's, but funding is held in a management reserve at the program manager's level. The Army is also exploring the use of TRACE for early production.

As part of the Initiative to Budget for Inflation, agreement was reached with the Office of Management and Budget to improve inflation projections for DoD acquisition programs. The FY 83 Defense budget and the Five-Year Defense Plan (FYDP) were based on a Defense "market basket" methodology resulting in budget assumptions

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for main procurement commodities (aircraft, missiles, ships and tracked vehicles) averaging approximately two points higher than the GNP deflator average. This is major step in the right direction on the inflation problem and will be of substantial benefit in our budgeting process.

In response to the Initiative on Forecasting Business Base Conditions at Major Defense Plants, the Cost Analysis Improvement Group (CAIG) is establishing a central repository for business base information. The Services have begun submitting business base estimates directly to the CAIG which will in turn make this information available throughout DoD for use in planning acquisition strategy and in developing realistic cost estimates.

Within the second category of Cost Growth Initiatives, all three Services have taken action to assure Appropriate Contract Type, by issuing guidance letters and reviewing programs at major milestones to ensure that appropriate contract types are used. We should report that fixed-price and fixed-price incentive contracts are still being used for development programs. Many, including the contracting community, view a fixed-price incentive contract for research and development as akin to a firm fixed-price contract at ceiling and not appropriate for such application. A recent step forward toward use of Appropriate Contract Type was made with a Deputy Secretary of Defense policy letter on this topic dated June 18, 1982. It will be distributed to all program and contracting offices. In addition, the working group is examining the possibility of injecting "cost credibility" into the source selection process, although a final position has not been reached. Completion of a draft DoD Instruction, originally scheduled for April, has slipped to July and will include currently recognized procedures and emphasize points noted in the December Task Force Report.

The Design-to-Cost Program is being improved in response to the Initiative on Design-to-Cost (D-T-C) Contract Incentives. The applicable DoD Directive is being revised to ensure that incentives are paid based on actual production cost performance, and that D-T-C goals are revised on a timely basis as program changes are incorporated. It is important to note that cost growth can be a design discipline problem. While D-T-C addresses this in one specific way, the working group is looking at other incentives which will influence decision-making in industry with regard to cost growth. An example of such an application is associated with the DIVAD program procurement strategy, where selective and selected factors were fixed, but the contractor was allowed to trade off performance factors in a successful effort to control cost.

The third category being monitored by the Cost Growth working group includes only the single Initiative on Funding Flexibility. DoD has proposed to Congress that we be allowed to transfer funds

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in a given fiscal year between Procurement and Research and Development accounts for an individual weapon system. It is expected that Congress will respond to this proposal in the FY 83 Appropriations Bill. As a result of DoD efforts to obtain an increase in reprogramming authority, Congress has agreed to increase the reprogramming threshold for R&D programs from $2 to $4 million, and the threshold for Procurement and Military Personnel from $5 to $10 million. This will simplify the administrative aspect of changes to program budgets.

Support and Readiness: The six Initiatives assigned to the Support and Readiness working group are an integrated set addressing key elements of the acquisition process: setting design objectives for readiness early on; structuring the program to include adequate development and test assets, incentive strategies, and design and support planning approaches to minimize support risks for the shortened acquisition cycle; using standard operating and support systems to reduce both costs and risks; assessing readiness in test and evaluation; and supporting weapon system readiness requirements in the Planning, Programming and Budgeting System (PPBS). The Initiatives have both long and short-term dimensions. For the long-term, improvements are being sought in acquisition and support planning procedures and in the overall quality of weapon system readiness management. In the short-term, high-payoff changes in current acquisition programs are being sought.

Implementation of the specific Initiative on Improving Support and Readiness began in June 1981 with a Deputy Secretary of Defense memorandum outlining follow-up actions. The first step was assignment of readiness goals as design objectives in all major acquisition programs, and all three Services have made solid progress in that direction. There is a remaining need to strengthen the organizations and procedures for test and evaluation of support and for providing independent readiness assessments as inputs to acquisition reviews. The Initiatives are being incorporated in revisions of DoD Directives and DoD Instructions.

A Deputy Secretary of Defense memorandum of March 1982 required visibility of, and priority for, front-end funding of test hardware. Additional policy statements are being included in revised Directives and Instructions. This Initiative has been pursued in Defense Systems Acquisition Review Council (DSARC) reviews, and the three Services have incorporated the Initiative in their test planning processes and in Program Objective Memoranda (POM) and Budget preparation.

An Under Secretary for Research and Engineering memorandum of August 1981 established guidelines for Contractor Incentives for Reliability and Support, including source selection criteria, award fees, warrantees, and the like. Based on the December Task Force Report recent actions have been initiated to review incentive

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applications in specific acquisition programs, and to start development of incentive approaches to be made available to program managers. To date, Service applications of Incentives appear to follow the historical pattern. It is not clear that there has been an increase in the use of Incentives for reliability and support. An August 1982 evaluation of ten cases from each Service is now scheduled. In addition, the Army has just completed a project designed to measure its progress in this area.

Implementation of the Initiative on Standard Operational and Support Systems will require strong advocacy both in OSD and in the Services. The Initiative has been covered by the November 1981 DoD Standardization Seminar, by a revitalized Defense Material Specifications and Standards Board in January 1982, and by the Defense Standardization Guidance in March 1982. Although some noteworthy near-term applications can be shown, unexploited opportunities for both intra- and inter- Service standardization abound. This situation will persist until the top acquisition managers take a clear position of advocacy, and issue definitive guidance to integrate standardization activities, and align management responsibilities.

A funding issue under review is whether there is some way to spread the cost over future programs without "charging" the first system through the cycle with the total cost of standardization. Criteria and mechanisms are needed for selecting further candidates and for enforcing material standardization. The Services will present recommendations for dealing with this problem in July 1982 to the Steering Group.

The Services are working toward improved procedures for enhanced visibility throughout the PPBS process of requirements and funding for initial lay-in of support for major weapons systems, and to keep the program manager fully informed of funding decisions affecting support of his system. A test of procedures was conducted on six systems during the FY 83 budget review, and some shortfalls were identified and resolved. A test of revised procedures is planned in parallel with the FY 84 program review. A remaining Service implementation task is development and trial of procedures for tracking weapon system support funding in budget execution. Based on progress to date, appropriate procedures for initial support funding should be in place during the next PPBS cycle. For accelerated (concurrent) development and production programs, the Acquisition Improvement Program requires an explicit option in the acquisition strategy for additional front-end efforts to balance reliability and support risks. Long-term implementation is being accomplished in conjunction with the earlier-discussed Initiative on Improving Support and Readiness. In the short-term, a number of acquisition programs have been structured to reduce acquisition time, but there has not been an accompanying commitment

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for additional front-end funding, or for extra effort on reliability and support (design discipline, parallel testing, contract incentives, etc.) Management emphasis needs to be increased at all levels to bring about substantial change. An example of such an effort is the Army "Steering Group" under the chairmanship of the Assistant Secretary for Research, Development, and Acquisition.

Long-term implementation plans for these six Initiatives are largely on track. DoD policy directives have been, or are being, updated to incorporate the Initiatives. Service procedures and organizations to implement them are proceeding on schedule, and should be in place by this summer. In the short-term, the Initiatives are being followed-up in the DSARC and PPBS processes. It is too soon to assess acquisition programs formulated from the beginning to meet the higher standards set by the Initiatives. However, DSARC guidance and budget decisions have added resources and directed management attention to improve support and readiness in a number of major acquisition programs late in development. Continued emphasis by top management in the mainstream of the acquisition process is needed.

Competition: The working group reviewed the implementation plans from the Military Services and the Defense Agencies. The plans indicate responsible, positive replies to the Under Secretary for Research and Engineering's memorandum of November 1981. Individual presentations to the Competition working group by each Service and Agency are in process. Follow-up will be made through the working group and the Office of the Deputy Under Secretary for Acquisition Management.

In addition to achieving their implementation plans, the Military Services have been tasked to study other actions that may enhance competition. The Army has been given the lead to study increased competition in subcontracting; the Navy, the lead to review whether additional guidance is required for competition based on factors other than price; and the Air Force, the lead to examine segregating noncompetitive procurements according to competitive potential for statistical reporting. The Office of the Under Secretary for Research and Engineering is undertaking a review to learn more about why specific contracts are sole-sourced. It has started to collect data on sole-source justifications, and will further examine business factors impacting sole-source decision-making.

The Navy has also taken the lead in advocating adoption of a modified Defense Acquisition Regulation (DAR) Case 79-42 (Competition in the Production Stage). This DAR case is intended to amplify current DAR procurement planning coverage by encouraging

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expanded use of various techniques to achieve multiple competitive sources. These techniques include joint teaming, co-production and the leader-follower concept in the production phase for both major and non-major system acquisitions. We expect this study will give us a sound framework within which to make acquisition decisions during the production phase.

In conjunction with the Initiative on Governmental Legislation, we have proposed legislation to provide the statutory negotiation authority to use the techniques contained in DAR case 79-42 for enhancement of competition in production. This Initiative is discussed in more detail later in the section on Legislation. In the interim, Services' use is limited to those cases that can be justified in the interest of mobilization and national defense.

The Logistics Management Institute has briefed the working group on their study focusing on price competition. The preliminary conclusions do not appear to identify an area where there can be significant opportunity to increase competition. Progress will be reviewed again in the near future to determine whether redirection will yield results.

One troublesome aspect of competition is that most viewers see the issue only in terms of statistics. This can be misleading. For example, a directed procurement to a second contractor may encourage, and has in several instances, encouraged the original source to resolve program problems. Similarly, the presence of an alternative weapon systems to meet a particular mission area requirement may have beneficial results in both the price and the performance of the original systems.

Along these lines, the Steering Group intends to examine "incentive-creating" techniques designed to enhance competition without regard for the statistical effect of the action. Competition is a means to an end, and not an end in itself. But because of the political impact of the statistics, we are also examining improved methods of reporting on the purposes of our business decisions.

As indicated earlier, the remaining Initiatives are being overviewed by independent OSD offices rather than by working groups. These offices are reporting to the Acquisition Improvement Steering Group on a regular basis. Their work is summarized below:

Management Principles; Implementation: The Defense Acquisition Regulation (DAR) Council has approved publication of Acquisition Improvement Program materials as Defense Acquisition Circular information items on a regular basis. Future issues will include material such as the April 30, 1981 Deputy Secretary of Defense

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memorandum and the December Task Force Report. Overall responsibility for implementation of the Acquisition Improvement Program rests with the Office of the Deputy Under Secretary for Acquisition Mangemmnt.

Capital Investment: Our legislative initiatives to permit more rapid capital equipment depreciation and to recognize replacement depreciation costs by amending or repealing Cost Accounting Standard (CAS) 409, "Depreciation of Tangible Assets," are on track. We expect passage of proposed legislation to transfer the authority of the defunct Cost Accounting Standards Board to the Office of Management and Budget to permit amendment or deletion of standards as appropriate.

Contract incentives promoting productivity investments are being developed. Issuance of a Productivity Guide outlining contractual techniques available will be followed by appropriate policy statements. In February 1982, the Under Secretary for Research and Engineering wrote to the Services asking that a tri-Service committee be established to prepare a unified draft policy document on Technology Modernization. The committee now expects to complete its work in July. A letter from the Under Secretary stressing quality and productivity was sent to selected industry associations in March 1982.

Increased use and frequency of milestone billings and advanced funding, as well as an expedited billing cycle, are being pursued. The Contract Finance Committee has submitted its proposed revisions for Milestone Billing Procedures to the Defense Acquisition Regulation (DAR) Council for publication in a Defense Acquisition Circular and incorporation into the Defense Acquisition Regulation. The Contract Finance Committee is in the process of reviewing the current payment procedures.

Negotiation of profit levels commensurate with risk and contractor investments is now required. OSD and Service policy and guidance have been issued. This action is complete from a policy perspective, and implementation is being monitored.

The DoD is increasing emphasis on the Manufacturing Technology (MT) Program. Current plans call for an MT investment of $1.8 billion FY 83-87 — double that of the previous five years.

The DAR Patents Subcommittee concluded that current DoD policy fulfills objectives of the original Initiatives with regard to patents. Defense Acquisition Circular No. 33 was published on February 15, 1982 providing information on policies and procedures governing patents. Various DAR cases remain active in this area.

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The 1934 Vinson-Trammell Act, with profit limitation provisions, was repealed by the DoD Authorization Act of 1982, signed in December 1981. DoD procurement activities have discontinued inclusion of excess profit provisions in all contracts/solicitations, and action is complete on this item.

DSARC Requirements; MENS in the PCM: Steps have been taken to streamline and decentralize the Defense Systems Acquisition Review Council (DSARC) process. In addition to reducing the number of DSARC milestones from four to two, ten DSARC programs were delegated to the Services when the dollar threshold for major systems was raised. Since then, six additional programs have had Milestone I or Milestone II decision authority delegated, and the authority for Milestone III production/deployment decision was delegated on three programs.

The documentation required for DSARC milestone reviews has been reduced. The thrust has been to reduce the number of programs which enter the DSARC process, to reduce the number of milestones a program is required to pass, and to reduce the documentation requirements for those milestones where the Secretary of Defense remains the decision-maker. DoD Directive 5000.1, "Major Systems Acquisition," was published earlier this year, and DoD Instruction 5000.2, "Major Systems Acquisition Procedures," is presently under discussion with the Services in an attempt to balance the need for reduced data requirements against that needed for informed decision-making. These documents articulate the streamlined milestone and documentation requirements noted above as well as the management principles and objectives contained in the Deputy Secretary's April 30, 1981 memorandum.

Action was taken in FY 82 to link the DSARC and Planning, Programming and Budgeting Systems (PPBS) processes. Last year the Defense Resources Board (DRB) reviewed the FY 83 Justification for Major System New Starts (JMSNS) and approved 15 programs while disapproving 4. The recently reissued DoD Directive 5000.1 and Defense Guidance for PCM-84 include further instructions to clarify the implementation of this Initiative during the upcoming FY 84-88 Program Objective Memoranda (POM) review. The implementation of this Initiative ensures better integration of the acquisition process with the budget process and will serve to shorten the front end of the acquisition cycle by removing funding uncertainty at the beginning of development. This Initiative should also help the affordability problem by weeding out programs that cannot be justified before substantial funding is provided.

Governmental Legislation: The working group used several avenues to identify potentially-burdensome programs imposed on the procurement process. Initially the group drew on the expertise of its members. In addition, it solicited information from

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procurement experts in the DoD components. Further, it contacted industry, industry associations, and other government agencies. Finally, it took advantage of written works on the subject and unsolicited submissions. As a result, it identified for review approximately 62 programs, primarily socio-economic, that had been imposed, (statutorily or administratively) on the procurement process. A number of initiatives already were under way in the non-socio-economic area, such as raising certain dollar thresholds. The group did not pursue these further.

Of the approximately 62 programs, the group determined that 12, because of their cost and burden, required immediate attention. This was reduced to 10 by the Deputy Under Secretary for Acquisition Management. These 10 were the subject of the initial effort. With respect to the remaining items, the group concluded that they were of lower priority in terms of cost and burden. Some were also ruled out because, on balance, they were perceived to be beneficial. These ten items discussed above and their current status are shown in Exhibit C. In each instance, action is now outside DoD as shown in Exhibit C.

The working group is now preparing legislative proposals for the following two additional matters:

- Ceiling for Small Business - Small Purchase Set-Asides - Amend the Small Business Act to increase the ceiling from $10,000 to $25,000.

- Authority to Negotiate to Establish Multiple Production Sources - Amend 10 U.S.C. 2304(a) to add a negotiation authority to allow the establishment of a second or multiple sources for enhanced competition and authority for enhanced competition and authority for excluding the incumbent sole source from competing in such acquisitions.

Legislation has been passed to increase the small purchase threshold to $25,000; the threshold for R&D Secretarial Determinations and Findings from $100,000 to $5,000,000; and the threshold for requiring certified cost and price data from $100,000 to $500,000 (FY 82 DoD Authorization Act).

A short history of this last action demonstrates why we earlier stated our intention to follow-up on pushing decisions down within a large organization. Prior to last year, certified cost and pricing data was optional below the $100,000 level. Where optional, it was infrequently requested. When the permissive level was raised to $500,000 through a Defense Acquisition Regulation (DAR) Amendment in December 1981, we learned from several sources that contracting officers were regularly requiring the data below the new permissive level. As a result, we directed the Services to issue memoranda directing collection of cost and price data only when circumstances so warranted.

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The procurement process, and the enactment of administrative regulations or legislation that may encumber it, are dynamic. These is need for a body of experts to monitor these areas on a continuing basis to identify problems and initiate remedial action. This function will be fulfilled by the Steering Group at the present time. The working group will continue to use Government and industry sources to identify new problems, continue to monitor those already under way, and address those that previously were determined to be low priority.

Reduce Administrative Cost and Time to Procure Items; Reduce the Number of Directives: Under Air Force leadership, an inter-Service team has developed, and will begin using on a test basis later this Summer, a simplified solicitation and contract documents for procurements under $500,000. We anticipate a substantial reduction in the size and complexity of these documents out of this program. A DoD Ad Hoc Directives Reduction Group is meeting under the auspices of the Office of the Under Secretary for Research and Engineering to develop recommendations to deal with the entire directives reduction process over time, to consider a "sunset" provision for new directives, and to identify areas in which the Under Secretary for Research and Engineering can mandate directives reduction.

In recognition of the importance of continued involvement by acquisition commanders, a meeting was scheduled between the Joint Logistics Commanders (JLCs) and the Deputy Secretary of Defense. Three specific improvements were initiated to bring the material and logistics commands more closely into the Acquisition Improvement Program:

- The JLCs have created a flag-rank committee to oversee their implementation of the 32 Initiatives and we will request that the Executive Secretary of the Steering Group sit on this committee.

- The JLCs will provide continued status reports, and will start to identify actions taken, results achieved, and cost savings attributable to the Acquisition Improvement Program.

- The JLCs will work with the OSD staff to develop a simple, effective, early warning system that identifies acquisition problems. This new effort will supplement current management information systems in the area.

We also expect that the two-star focal points in each buying command will lead the effort to push down policy initiatives to the working level. This increased participation of the Joint Logistics Commanders working through their Service Chiefs and Secretaries will provide needed additional emphasis as we enter the second year of the Acquisition Improvement Program.

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A major effort in support of the Acquisition Improvement Program (AIP) has been underway throughout the year at the Defense Systems Management College (DSMC). The DSMC has briefed the AIP to 100 audiences totaling 9500 people from coast-to-coast. The process of briefing the acquisition and commodity commands is nearly complete, and a number of industry groups have also received the presentation. The AIP is an integral part of the curriculum at DSMC. Numerous instructional and training aids have been prepared, and loaned for use both within the continental U.S. and Europe.

DSMC is currently assembling a package of reprints and papers for distribution to eighteen Defense management education and training organizations (the intermediate and senior Service schools, etc.), designed to aid these organizations in restructuring their own curricula to incorporate the AIP. An ongoing research effort has resulted in several articles in various publications during the past year. The entire Summer 1982 issue of Concepts will be devoted to the AIP, and will contain 15 articles prepared in conjunction with the Acquisition Improvement Steering Group. Distribution of 8000 copies should be completed by late Summer. In addition to our in-house efforts, several industry associations have moved out to teach the Acquisition Improvement Program. One of the more notable efforts has been that of the Sterling Institute on behalf of the National Security Industrial Association.

Separate from the Acquisition Improvement Program, the President's Executive Order on Federal Procurement Reform bears mention. The Department of Defense worked closely with the Office of Federal Procurement Policy (OFPP) through signature of this document on March 17, 1982. We believe that it will lead to additional improvements in the procurement process. In brief, the order directs the heads of Executive Agencies involved in the procurement of goods and services to:

- Reduce the cost and complexity involved in doing business with and within the Federal Government,
- Enhance competition,
- Strengthen program reviews to balance program needs against mission priorities and available resources,
- Establish criteria to improve the effectiveness of the procurement system,
- Establish career management programs to improve the quality of the workplace, and
- Designate an agency-wide executive responsible for implementation of the order.

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As the result of existing policies and procedures, and as a result of the Acquisition Improvement Program, we are in substantial compliance with this order today. Nonetheless, we have taken rapid action to assure full implementation through the establishment of a comprehensive review of the entire DoD procurement system. This work will complement that of the Acquisition Improvement Steering Group.

In closing, let me note that during the past few months we have begun to receive positive feedback at all levels from individuals outside the Department of Defense - and we read this as a sign that the Acquisition Improvement Program is beginning to take hold in a meaningful way. We expect to report significant additional progress throughout 1982.

William A. Long

WILLIAM A. LONG
Deputy Under Secretary
(Acquisition Management)

Enclosure
Exhibits A-C

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ACQUISITION IMPROVEMENT STEERING GROUP

CHAIRMAN

Mr. William A. Long, Deputy Under Secretary of Defense (Acquisition Management)

EXECUTIVE SECRETARY

Mr. James L. Wolbarsht, Special Assistant for Acquisition Management

ARMY

LTG James H. Merryman, USA, Deputy Chief of Staff for Research Development and Acquisition

NAVY

VADM Robert R. Monroe, USN, Director of Research, Development, Test and Evaluation

Mr. Everett Pyatt, Principal Deputy Assistant Secretary of the Navy (Shipbuilding and Logistics)

AIR FORCE

Mr. James E. Williams, Deputy Assistant Secretary (Acquisition Management)

MANPOWER, RESERVE AFFAIRS, AND LOGISTICS

Dr. Richard Webster, Deputy Assistant Secretary (Supply, Maintenance, and Transportation)

Mr. Russell Shorey, Special Assistant for Weapons Support

PROGRAM ANALYSIS AND EVALUATION

Mr. Thomas Christie, Deputy Director, General Purpose Programs

Mr. Milton A. Margolis, Deputy Director, Resource Analysis

DEFENSE LOGISTICS AGENCY

BGEN Charles F. Drenz, USA, Deputy Director, Acquisition Management

Exhibit A

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COMPTROLLER

Mr. Joseph T. Kammerer, Deputy Assistant Secretary (Cost and Audit)

LEGISLATIVE AFFAIRS

BGEN Bruce Harris, USA, Deputy Assistant Secretary (Operations and Plans)

GENERAL COUNSEL

Mr. Dennis Troech, Assistant General Counsel (Logistics)

OFFICE OF THE UNDER SECRETARY FOR RESEARCH AND ENGINEERING

Mr. Harvey Gordon, Assistant Deputy Under Secretary (Acquisition)

Dr. Paul Berenson, Special Assistant for Assessment

RADM Isham Linder, USN (Ret.), Director of Defense Test and Evaluation

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INITIATIVES BY WORKING GROUP

PROGRAM STABILITY

4 Program Stability
7 Economic Production Rates
29 DSARC/PPBS Integration

MULTIYEAR CONTRACTING

3 Multiyear Contracting

PREPLANNED PRODUCT IMPROVEMENT

2 Preplanned Product Improvement

COST GROWTH

6 Budget to Most Likely Cost
8 Appropriate Contract Type
11 Technological Risk
15 Funding Flexibility
18 Inflation
19 Business Base
20 Source Selection
22 Design-to-Cost Contract Incentives

SUPPORT AND READINESS

9 Support and Readiness
12 Front-End Funding for Test Hardware
16 Contractor Incentives for Reliability and Support
21 Standard Operational and Support Systems
30 Program Manager Control of Logistics and Support Resources
31 (Folded into #9 above in December 1981 Report)

COMPETITION

32 Competition

Exhibit B

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CURRENT STATUS OF PROPOSED LEGISLATIVE INITIATIVES - INITIATIVE 13

1. Section 8(a) Pilot Program - DoD continues to oppose draft legislation to extend the Section 8(a) pilot program to DoD. The Office of Management and Budget (OMB) was so advised on April 9, 1981. S.1620 and H.R. 4459 are in Committee; H.R. 4500 was passed in the House in November 1981.

2. Walsh-Healey - (a) Amend the Walsh-Healey Public Contracts Act to increase the minimum threshold to $25,000. See Item 10.

(b) Amend the Walsh-Healey Public Contracts Act to permit a 4-day, 40-hour week without premium overtime compensation. DoD supports pending legislation (S. 398; H.R. 3185; H.R. 2911).

(c) Amend the regulations of the Department of Labor (DOL) to eliminate the distinction between suppliers of new and used automatic data processing equipment with respect to the requirement to maintain store or warehouse stock. Regulatory initiatives are being coordinated with DOL.

3. Contract Work Hours - Amend the Contract Work Hours and Safety Standards Act to permit a 4-day, 40-hour week without premium overtime compensation. DoD supports pending legislation (see Item 2(b) above).

4. Davis-Bacon - Support proposed DOL regulations to revise procedures for establishing prevailing wages, extending coverage to construction helpers, and other changes. Revisions proposed by DOL are in the comment stage; final rules expected mid-summer.

5. Service Contract - Amend the Service Contract Act to remove substantial administrative and direct costs in the acquisition process. Specific legislative changes were provided to OMB on February 19, 1981. However, the Secretary of Labor has proposed regulatory revisions that generally address these same issues. DoD now supports these regulatory changes. Final rules are expected in mid-summer.

6. Fee Limitation - Amend the Armed Services Procurement Act to delete the 10 percent fee limitation on cost-plus-fixed-fee contracts. Legislative initiative was submitted to OMB on March 4, 1982.

7. E.E.O. - Monitor DOL activity to streamline regulations regarding nondiscrimination in Federal contracts. DOL published revisions for comment in the Fall of 1981. Final rules are still pending.

8. Copeland Anti-Kickback - Amend the Copeland Anti-Kickback Act to relieve contractor of the requirement to provide weekly wage statements. Legislative initiative submitted to OMB on January 19, 1982.

9. Retiree Suggestions - Amend the Armed Services Procurement Act to delete the requirement to solicit suggestions from retiring civilians and military personnel. DoD-sponsored legislation was submitted to the House of Representatives on May 1, 1981.

10. Thresholds - Amend 11 statutory thresholds to achieve a level of applicability for significant socio-economic programs at $25,000. Statutes include, among others, the Davis-Bacon Act, Service Contract Act, Employment of the Handicapped Act, Walsh-Healey Public Contracts Act, and Small Business Act. A legislative initiative was submitted to OMB on February 24, 1982.

Exhibit C

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Question. Is the Secretary satisfied with the cooperation and the efforts of the military departments in applying the initiatives? If not, then why not?

Answer. The Secretary is very pleased with the efforts of the Services on behalf of the Acquisition Improvement Program. He feels that one reason the Services and industry are so supportive of the Program is that they were instrumental in developing the recommendations and the initiatives. What we are encouraging now is the Services to implement their own ideas, and we are receiving an unusually positive response. There are one or two areas where OSD and the Services differ on the best means to reach the goal, but we are all moving toward the same set of goals.

Question. In a memo concerning the December 1981 report of the Aquisition Improvement Task Force, you concluded that "After having institutionalized the actions identified by the Task Force, our emphasis should shift to more qualitative assessments to determine and measure meaningful improvement in the DOD acquisition process." Once you are assured that the Acquisition Improvement Program has been substantially implemented, what measures does the Office of the Secretary of Defense plan to take in order to demonstrate that the initiatives have in fact begun to meet the objectives for which they were established?

Answer. We are tracking the progress of the initiatives on a continuing basis. For example, in the Secretary's Posture Statement this year, he reported that our projections showed $2.3 billion in savings attributable to the Acquisition Improvement Program in fiscal year 1983, and $13.7 billion in savings over the period of the Five-Year Defense Plan. Such identified savings are measured in those areas, such as multiyear procurements and economic production rates, that are susceptible to quantification. In more qualitative areas such as pre-planned product improvement, we were tracking the decision meetings at which the concepts are considered, such as those of the Defense Systems Acquisition Review Council, to ensure that top management is giving appropriate weight to the management principles when overseeing procurement.

Question. What information will you collect to show that estimates are more accurate, that certain costs have decreased, that acquisitions take less time, or that defense industry has actually benefited?

Answer. The primary method of collecting and reviewing information on new acquisition initiatives will be the annual Program and Budget review process. Major systems will be carefully reviewed to insure that initial cost estimates are priced realistically, that sufficient funds are set aside for technological risk, economic production rates are considered, that Preplanned Product Improvement will be used in lieu of new starts where applicable, that competition is considered in all phases of the life cycle, including application at the subcontractor tier, and that proper inflation rates are used. Also, candidate systems for multiyear procurement contracting will be considered during the review. Particular attention will be paid to stabilizing programs to reduce the perturbations that have added to program costs in the past. In addition to the above,

the Secretary of Defense and the Services have set up new acquisition and management teams to monitor and review during the year major acquisition systems, procurement practices, and associated economies and savings. Selected Acquisition Reports will be used to track and measure baseline cost estimates of major systems with actual cost data from contractors. We are confident that the new acquisition initiatives will provide for substantial improvements and significant savings to DoD and industry programs in both the short and long term.

Question. Do you plan to have the Assistant to the Secretary of Defense for Review and Oversight independently review (a) how well the Services are implementing the initiatives, and (b) what impact the initiatives are having on DoD's acquisition process?

Answer. It is a bit early to answer that, except to say, not at this time. As our July report indicates, we have completed a policy development phase, and are now working toward pushing the policy down to the working levels in the field. Possibly, a year from now we would want to assess our success at that effort.

Competition in Procurement

Question. On February 24 of this year, Secretary Weinberger stated, "We now have an aggressive effort to increase competition. In July 1981, the DoD components were requested to develop objectives to increase competition." How will these objectives be achieved?

Answer. By top management attention; by coordinated effort of procurment, program management, engineering, financial management, legal, supply, and maintenance personnel; and by close monitoring by the advocates for competition designated at each procuring activity.

Question. How do you intend to evaluate whether these objectives are being attained?

Answer. Evaluation will be accomplished through analysis of competition statistics reported through our computerized procurement management reporting system.

Question. At what level will achieving these objectives be monitored?

Answer. The program will be monitored at all levels of management up to and including the secretarial level of the Military Departments and the Department of Defense.

Question. Do you have any examples to date of major savings attained through increased competition?

Answer. Concurrent with the execution of the FY 82 budget, Heads of Contracting Activities were directed to develop internal procedures for collecting and reporting significant accomplishments and innovative approaches to increasing competition. This information will be submitted on a semi-annual FY basis within 60 days after the end of the second and fourth quarters. The initial report is due 30 November 1982.

M-1 TANK FIRE CONTROL COMPONENTS

Question. Let me explain why the Committee is concerned that these efforts may be futile. For example, the Army budgeted $83.4 million in fiscal year 1983 to establish a competitive second source for M-1 tank fire control components. Experience with similar components for the M60A3 tank has shown that competition can yield savings of 45 percent. Yet, we were recently informed that the Army has abandoned its plans for early competition, and intends to enter a three year sole-source contract instead. Why are savings and benefits for competition being sacrificed for three years in order to maintain the current relationship with the sole source contractor?

Answer. Army analyses showed that the greatest potential savings can be realized through a multi-year contract with the current producer. Army leadership has reported in testimony this Spring that multi-year contracting and second source development would both be considered and the option offering the lowest procurement cost would be selected. The Army is near a decision on this issue and will inform the Congress as soon as it is made.

Question. If the technical data package is not yet complet, why do we find ourselves in this situation after 6 years of production funding for the M1.

Answer. The thermal imaging system (TIS) is a complex assembly and it is taking time to stabilize the TDP. And while production has been funded for four years (plus advanced procurement in fiscal year 1978), only 435 tanks have been delivered through May, 1982. The Army fully expects the TDP to stabilize as M1 production rates increase.

Question. Why will it take three more years to get a Technical Data Package?

Answer. The Army estimates that the technical data package for the thermal imaging system and the laser rangefinder will be stable in about one year.

Question. How much money are you requesting this year to establish second source procurements?

Army answer. $80.6M is included in fiscal year 1983 request for second source development of M1 fire control.

The Army is currently pursuing and actively planning the second sourcing of systems/components where it is economically prudent to do so. This supports the Defense Acquisiton Improvement Initiative #32 purpose of enhancing the competitive environment. The following list of present and planned source programs indicates the Army position in this effort:

PRESENT (FUNDED)

Patriot (Components);
Bradley Fighting Vehicle Systems (Components);
Ammunition programs with sufficient quantities.

PLANNED

Hellfire Missiles (all-up-round sources);
TOW 2 launcher modification;
Bradley Fighting Vehicle Systems (Components and ammunition);
Patriot (components);
Ammunition programs with sufficient quantities.

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Exact distribution of funds within programs for component second sourcing has not been determined at this time. Sufficient flexibility exists to take advantage of component breakout to second sources.

Navy programs

RDT&E,N:	
AN/AYK-14 Standard airborne computer	$5,000,000
Total RDT&E,N	5,000,000
WPN:	
BGM-109 Tomahawk	10,000,000
AIM-54A/C Phoenix	3,000,000
AGM-88A Harm	40,000,000
Total WPN	53,000,000
APN	None
OPN	None
SCN Mine countermeasures ship	21,000,000
Total SCN	21,000,000
Total Navy	79,000,000

Air Force answer. The following are the fiscal year 1983 Air Force funding requests to establish second source procurements:

(1) AMRAAM—Amount: $8.4 million; Appropriation: 3600.
(2) JTIDS Class [illegible]erminal—Amount: $4.1 million; Appropriation: 3600.
(3) NAVSTAR G[illegible]S—Amount: $1.8 million; Appropriation: 3600.
(4) MX Program—Component: Third Generation Gyroscope—Amount: $5.9 million; Appropriation: 3600.
(5) Seek Talk—Amount: $.2 million; Appropriation: 3600.
(6) HARM—Amount: $40.0 million; Appropriation: 3020.
Total: $60.4 million.

Engineering Support Contracts

Question. The Services annually award numerous engineering support contracts, many related to such functions as operating test ranges and proving system engineering services. It would appear that competition in these awards has fallen into disuse, in some cases at least. For one example, the Air Force stated that the contract to operate and maintain the test range at Eglin Air Force Base has not been competed since 1958, and the same contractor has been in a sole source position the entire time. For another example, the Army has had the same sole source contractor for systems engineering and technical assistance on Ballistic Missile Defense at Huntsville since 1971. Why would DOD allow noncompetitive situations to exist over long periods such as the 24-year and 11-year examples cited above?

Answer. Eglin AFB was not competed because the technical expertise, respnsiveness and experience of the incumbent contractor were very good. Costs have been closely controlled over the years through effective management. Labor, which is 93 percent of the cost, is not significantly subject to reduction from competition due to the Service Contract Act. The Air Force Systems Command is now competing the requirement.

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Question. What is your plan for reviewing these tyes of procurements with the intent of ensuring that competition is used as a means of lowering costs?

Army Answer. The plan encompasses the following procedures which are used in the review of all sole source acquisitions, including the System Engineering and Technical Assistance Contractor (SETAC) effort:

a. Prior to the beginning of each fiscal Year, or before processing a contractual action, detailed information concerning each proposed sole source contract is reviewed by an Acquisition Review Board. This board is chaired by the Ballistic Missile Defense Program Manager (BMDPM)(Head of the Contracting Activity), and includes the Principal Assistant Responsible for Contracting and other senior military and civilian managers of the Ballistic Missile Defense Organization. The purpose of this review is to assure that the requirement is valid and that the method of acquisition is appropriate, including full consideration for competition and small business.

b. To initiate contract actions for a firm requirement, a Contract Requirements Package is prepared by the Requiring Activity and processed through contract channels. If this requirement is not proposed as a competitive acquisition, one of the documents required in the package is a noncompetitive justification prepared by the requiring organization and signed by its Director. This justification must explain and justify the reasons for sole source acquisition and identify actions being taken to foster competition on future buys. This noncompetitive justification must be reviewed by Legal Counsel and the Contracting Officer, and be approved at a level higher than the Contracting Officer (DAR 3-101(d)).

c. A review is also performed by the Associate Director for Small and Disadvantaged Business Utilization (ASADBU) prior to issuance of a solicitation. While this review is basically to ascertain whether adequate consideration has been given to the small business community and labor surplus area concerns, the competitive aspect is also examined. The ASADBU is supported, as needed, by the cognizant Small Business Technical Advisor.

d. Prior to the issuance of any solicitation expected to exceed $100,000, a Solicitation Review Board, composed of knowledgeable pesonnel whose backgrounds include contracting, technical, pricing, small business, and legal, again review the requirement to ascertain, among other things, whether adequate consideration has been given to competition.

e. Prior to award of any negotiated contract valued at $100,000 or more, the final contract instrument and all supporting documentation are reviewed by a Board of Awards (ADARS 1-403.52), which is composed of another select group of knowledgeable people. The purpose of this review is to determine that all aspects of the acquisition are proper, including award to a single source.

f. In addition to the above reviews, which are performed within BMDO, there are Determination and Findings (D&F) for Authority to Negoitate Contracts which are prepared each year and forwarded for Secretariat approval at Department of Army level. These D&Fs include the major sole source contracts such as the SETAC effort and include supporting information such as: (1) description of

effort; (2) background and history; (3) estimated cost; (4) whether sole source of competitive; and (5) period of performance. When an acquisition is planned to be D&Fs are reviewed by Army staff and approved at Army Secretariat level.

g. an advance Acquisition Planning System (AAPS) was recently established by the BMDPM to assure effective management of the acquisition process by emphasizing timely and comprehensive planning which includes special attention to fostering competition through close scrutiny of all planned sole source acquisitions. The BMDPM and senior managers of the BMDO participate in these reviews, which are conducted semiannually. The AAPS includes a review of all continuing major sole source acquisitions that are planned for the next 1-5 years. This allows adequate time for proper planning and execution of those acquisitions which may be competed.

Navy answer. In the Navy, with the signing of SECNAVINST 4200.31 of 24 Sept. 1981 on Contractor Support Services, Secretary Lehman stated that the intent of his guidance was to ". . . emphasize competition as the preferred method of acquiring these services." Engineering support contracts is one particular area where Navy efforts to improve competition statistics is focusing inasmuch as these services fall within the guidelines mandated by the aforementioned instruction and its implementing instruction, NAVMATINST 4200.50C of 1 Feb. 1982.

All requirements for these services with an estimated cost in excess of $50,000 must be reviewed and approved by a Flag Officer or member of the Senior Executive Service. Moreover, all requirements over $1 million that are expected to be awarded without competition must be reviewed and approved by the Department of the Navy Oversight Manager. A significant portion of the critical review and approval process conducted by the Approved Authority (Flag-SES or DON Oversight Manager) is directed at enhancing competition on the subject requirement and/or subsequent procurement of the service.

Air Force answer. The Air Force has twenty-three (23) major operation and maintenance service contracts. Our policy is that these contracts be competed every 3 to 5 years unless there are overriding circumstances. All but 2 of these contracts have been competed in the last 5 years. One notable exception is the Eglin AFB Range contract. However, this contract is now being competed.

The Eglin requirement was reviewed many times for possible competition. It was not competed due to excellent cost control by the incumbent contractor and the minimum amount of savings anticipated, when weighed against the turmoil involved in changing contractors. Since the Air Force record is good, there is no need to change current plans for reviewing these competition decisions.

Component Breakout Programs

Question. Component breakout programs are intended to identify sole source items which are suitable for competitive procurement, and sole source items which can be procured directly from the actual manufacturer rather than through the prime contractor who is not the manufacturer. GAO found that the program offers

opportunities to reduce costs but indications are that DoD is not maximizing its opportunities. OSD pointed out in answer to questions on March 19th that the component breakout programs "are the responsibility of and are overseen by all program managers, project managers, project officers, program directors, and various management levels within the DoD involved with the acquistion process." Why isn't there a single focal point in OSD responsible to effectively implement this program?

Answer. The reason why there is not a single focal point in OSD to *execute* a component breakout *program* is that there neither is nor should be a program to "maximize" any one procurement technique or option which can produce certain benefits under certain circumstances. In addition, the decision on component breakouts has to be made at the operating level by program managers and contracting officers and not in OSD where the specific information on which to base a rational decision regarding breakout in a given acquisition is not available. The Defense Acquisition Regulation (DAR) establishes policy, assigns responsibility, and provides guidelines for breakout decisions. My office is the focal point for the policy on breakouts. I question a finding that we are not "maximizing" our oportunities for breakout. Clearly, suboptimization around one technique is not the goal as this finding would seem to imply. Our breakout guidelines in the DAR spell out the "subject to" conditions that pertain to breakout decisions.

Question. OSD advised there is no "rule of thumb" as to how much or how many components can be broken out of a system. "The decision depends on many factors and the decision must be made on a case-by-case basis". Is this one of the reasons why component breakout programs have not been more effective?

Answer. A review of our policy on the DAR clearly indicates why there is no simplistic "rule of thumb" that can be applied to breakout decisions. For example, the DAR identifies policies for spare parts breakout, components of end items that have been included as contractor-furnished material in previous procurement of the end item, and government review of the make-or-buy decisions made by a prime contractor in the initial procurement of an end item. The government can either buy a complete system as the end item, or buy all the piece parts and act as system integrator and thereby incur in-house costs associated with this effort, or it can attempt to determine on a case-by-case basis which approach or combination will ensure a fair and reasonable price for the end item when adequate price competition cannot be obtained. A "rule of thumb" obviously cannot deal with decisions of such complexity.

Question. OSD further stated "It is our policy to breakout a component if there are substantial net cost savings and provided such action does not jeopardize the quality, reliability, performance, or timely delivery of the end item." This policy is so broad, subjective, and vague it can be used in all cases not to breakout a component. Is this one of the reasons why the program has not been more effective?

Answer. The allegation that our policy on component breakout is "broad, subjective, and vague" appears to suffer the shortcomings it seeks to ascribe to a considerably greater extent. How would a "rule of thumb" which disregards expected net cost savings or dele-

terious effects on system quality, reliability, performance, and timely delivery be to the government's advantage?

Question. What do you mean by "substantial net cost savings"? Do the people responsible for the program fully understand what it means?

Answer. The concept of "substantial net cost savings" does not stand alone in the DAR. It is understood by the people making individual breakout decisions in the context of the remainder of the policy statement and the guidelines for breakout decisions. There is a need for subjective judgments by acquisition professionals regarding the risks of pursuing one course of action as compared to another. A significant difference between their judgment and a subsequent review is that the review is never prospective and therefore devoid of any risks.

Question. In most cases, prime contractors order components from subcontractors, vendors, and suppliers by citing his drawings. DoD also has these drawings, and can do the same. In such cases, how can a program or project manager or director fail to break out a component by claiming to do so will jeopardize quality, reliability, performance, or timely delivery of the end item?

Answer. To follow the logic of this query one step farther, why should the Government hire a prime contractor at all? The answer is that it is the Government's policy to rely on the private sector for the acquisition of commercial or industrial products and services. Included in those acquisitions are the management and other services necessary to furnish end items of military equipment. When the prime contractor's make-or-buy plan includes the purchase of components from vendors and suppliers, his services cover all aspects of these purchases, including ordering, quality assurance, materials handling and storage, scheduling for assembly, and the like. The initial make-or-buy decision is a function of cost, schedule, industry structure, and similar considerations.

Question. Is one of the reasons this program has not been more successful because the prime contractor continually resists all attempts by DOD to breakout components from him?

Answer. A basic objective of anyone offering goods or services for sale is the customer's satisfaction with the product. Therefore, there is nothing inherently sinsister in the general tendency of prime contractors to want to have control over all aspects of a program in order to ensure the customer's satisfaction regarding cost, performance, quality, reliability, and timely delivery.

Before the government breaks out components for direct purchase from suppliers, the entire cost of doing so in terms of net savings over the additional costs and risks incurred by the government must be evaluated. Our policy clearly calls attention to such costs and risks and encourages breadout when it is to the government's advantage. Even if conditions are presently unfavorable to breakout, acquisition officials are required to consider the feasibility of eliminating such unfavorable conditions.

Question. Are program/project managers/directors required to submit reports to someone citing why they are not breaking components from the prime contractors?

Answer. Purchasing activities are required by the DAR to document: (1) those components which have been reviewed and deter-

mined to have no potential for breakout; (2) those components which have been reviewed and earmarked as being susceptible to breakout pursuant to 1-326.3; and (3) those components for which a decision to breakout has been made.

Documentation of these three categories, and for those components once earmarked but no longer considered susceptible to breakout, shall be signed by the cognizant project manager or other designated official and reflect the facts and conditions of the case, including any assessment by the contractor, and the basis for the decision.

Question. The B-1 is now in production. The component breakout program, according to OSD, starts with the initiation of acquisition strategies and procurement planning to effectively develop, produce, and deploy a major program. The strategy and planning is reviewed on a continuing basis throughtout the life of the program. How many such reviews have been conducted on the B-1 program, and identify all components of the B-1 that will be procured by DOD directly from the manufacurer rather than through the prime contractor—other than the engine, which is a very vital component of the B-1.

Answer. The B-1B System Program Office (SPO) has conducted two component breakout reviews on the B-1B weapon system in an effort to identify system components that could be procured directly from the manufacturer rather than through one of the four associate contractors—Rockwell, Boeing, AIL, or General Electric.

Normally, a system breakout determination is made after a weapon system production line has matured. While several system components have been identified as potential candidates for direct procurement, a commitment at this early stage in the production of Lot I (1 acft) would be premature. The B-1B SPO anticipates that sufficient data will be available to make a component breakdown decision on the B-1B during the production of Lot II (acft 2-8).

SPARE PARTS BREAKOUT FOR COMPETITION

Question. In February, the committee asked why an aggressive program was not underway DoD-wide to reap these savings. The Department replied: "We do have a program to break out spares for competition or to go directly to the manufacturers. This program is currently being reviewed to strengthen its application".

Who did this review, and what were its results?

Answer. The current review was accomplished by a task group chaired by the Army and composed of members from the other Services; the Defense Logistics Agency; the Office of the Director, Small and Disadvantaged Business Utilization; and the Office of the Secretary of Defense. The task force concluded it was appropriate to significantly revise the existing Joint Service Regulation implementing the program in order to improve the procedures and effectiveness of the program. A draft of the revised regulation has been forwarded to industry (large and small business) and other government agencies (e.g., Small Business Administration and OFPP) for comment.

Question. What specifically are you now doing to strengthen the breakout of spares for competition?

Answer. Specific actions to strengthen breakout of spares for competition are:

1. The program threshold will be revised to apply to parts with an annual buy value of $10,000.
2. Small Business Administration representatives will be invited to screening conferences.
3. Breakout activities will be required to establish breakout program managers to monitor the program.
4. Parts with restrictive codes will be rescreened at least every three years.
5. A reporting requirement will be established.
6. The screening procedure will be simplified, shortened and made clearer.

WEAKNESSES IN DEFENSE PROCUREMENT OFFICES

Question. A variety of weaknesses exist at Defense procurement offices. These weaknesses range from (a) failure to consolidate procurements in order to take advantage of economic production with resultant lower prices, (b) categorizing prices as "competitive" when in reality this was not an adequate basis for accepting the proposed prices, and (c) using competitive negotiation procedures with "best and final offers" when sole-source negotiations would have been more effective and economical.

Obviously, OSD does not intend to take any specific steps to determine whether or not these deficiencies are "a widespread condition." The answer merely states in part that "Through procurement management and internal audit reviews, these matters are called to the attention of purchasing offices." What good does it do to call it to the attention of purchasing offices?

Answer. We believe that our policies adequately cover these areas. However, with 12.7 million procurement transactions annually, there is always the possibility that isolated procurements are not handled as efficiently as we would like. Any deficiencies should be brought to the attention of the purchasing offices so that the purchasing personnel involved can be advised of their mistakes and the correct procedures they should be following.

Question. Have you taken disciplinary action at these purchasing offices?

Army answer. Army procurement management and internal audit review reports have been reviewed by management and disciplinary action has not been deemed necessary. These reports have been instrumental in directing management attention to, at times, previously unidentified weaknesses in purchasing offices. Corrective actions by management have included increased internal reviews, issuance of guidance, and additional training where appropriate.

Navy answer. Depending on the severity and type of infraction involved disciplinary action has ranged from verbal warning to criminal prosecution.

Air Force answer. The Air Force relies on supervisory responsibilities and the "chain of command" as control measures to minimize instances where procurements do not conform to established policy and good business sense, although some nonconformance is

not surprising in a workload universe approaching 4 million actions per year.

Purchasing offices are reviewed by various organizations through management reviews and audits. Deficiencies that are found are made known to local (purchasing office) managers, who deal with the situation through their normal supervisory role. HQ USAF would not be involved in disciplinary action at purchasing offices; however, it has issued admonishments to commands.

Question. What do you mean by the phrase through "procurement managment" these matters are called to the attention of purchasing offices?

Answer. Departmental procurement management review teams visit purchasing offices periodically to review their efficiency and effectiveness in awarding contracts and complying with established policies and procedures. Following the reviews, purchasing officers are advised both orally and in writing of problems and shortcomings noted during the reviews.

Question. If "procurement management and internal audit reviews" are effective, why do these weaknesses still prevail?

Answer. Human frailty is probably the main reason. With heavy workloads and short deadlines, individual buyers and contracting officers may find themsevles consummating awards which, in retrospect, may not be up to acceptable levels. With 12.7 million procurement transactions annually, this will sometimes occur. The problem is magnified by personnel turnovers.

Price Negotiations Memorandum

Question. One of the most important documents required after a contract negotiation is the Price Negotiation Memorandum (PNM). This document should state the principal elements of price negotiations, the significant considerations affecting price, why cost and pricing data are not required, the extent to which the contracting officer recognized inaccurate data, and it tracks the contract price from the contractor's proposal to the final negotiated price. The PNM is the only way the Defense Contract Audit Agency (DCAA) can know how their work was used so that their audit processes and techniques can be improved. Therefore, the PNMs are to be furnished to the DCAA after negotiation. GAO found contracting officers are not preparing the PNM and submitting them to DCAA. At one DCAA office 33 percent of the PNMs were not received and at another office the deficiency was as high as 43 percent. In answer to a question concerning this deficiency, OSD stated that it "appears copies were not given to the auditor in the cited instances"and that a recently issued Dod Directive 5000.42 requires that PNMs be furnished to DCAA at the conclusion of each negotiation. Do you believe that merely issuing a directive solves and corrects problems?

Answer. No, we do not believe that issuing a directive is, in itself, a solution to any problem. However, as a part of this directive our internal audit organizations have been assigned the responsibility to determine that the contracting and audit functions are fulfilling their responsibilities. We believe this follow-up procedure will assure that required PNMs are issued

Question. Were letters of reprimand written for such violations, were the offices involved called concerning this matter, or did OSD take any overt action, other than issuing a Directive, to assure itself that this deficiency was corrected promptly?

Answer. OSD action in this situation was limited to the issuance of our directive on audit follow-up.

Question. Is there any real concern at the OSD level about contracting officers' failure to submit PNMs to DCAA?

Answer. OSD is deeply concerned. The directive with its requirement for follow-up action on the part of internal audit and management officials represents a significant commitment of our resources.

NUNN AMENDMENT ON COST OVERRUNS

Question. The so-called "Nunn Amendment", which was included in the Fiscal Year 1982 Defense Authorization Act, requires the DoD to report to Congress when a system has exceeded a baseline unit cost by various percentages, including the impact of several years' projected inflation. We will place in the record at this point, a list of the programs, by Service, which have breached their cost estimates by various percentages, some are over 15 percent, and many others are up over 25 percent.

[The material follows:]

ARMY

Following systems have program acquisition cost or program unit cost by over 25 percent after inflation: Roland; Hellfire; Patriot; Pershing II; and Advanced Attack Helicopter.

NAVY

Some of the following programs have exceeded baseline program acquisition or program unit costs by more than 15 percent, others by more than 25 percent. FFG–7 Guided Missile Frigate; Phoenix (AIM–54 A/C; SSN–688 Class Submarine; F–14A Tomcat; Sparrow (AIM/RIM–7M); Trident I (C–4) Missile; 5-Inch Guided Projectile; and Sidewinder (AIM–9M).

AIR FORCE

Some of the following Air Force programs have exceeded baseline program acquisition or program unit costs by more than 15 percent, others by more than 25 percent. Maverick; F–15; F–16; AIM–7M; A–10; and Defense Satellite Communication System (DSCS).

In your view, is there a "common denominator" which can be cited as a reason for the costs increase which have been reported thus far as a result of the Nunn amendment?

Answer. With few exceptions, the most common cause for breaches of the Nunn Amendment thresholds is program instability. In cases where additional quantities of a system have been planned for purchase, the inflation associated with such buys has created program unit cost threshold breaches. In cases where reductions in quantity occurred, amortization of costs over reduced quantities has resulted in program or current year unit cost threshold breaches. Fourteen out of the eighteen programs reported to Congress experienced changes in quantities resulting in threshold breaches; seven due to additional planned buys and seven due to reductions.

BEST DOCUMENT AVAILABLE

Question. In the "support documentation" which explained the cost overruns, inflation was frequently cited as an important factor causing the cost increases. However: Inflation has been slowing substantially, and the Nunn Amendment requires the report of programs which have increased substantially in cost *above* a projected inflation rate.

Do many of these cost overruns indicate that the inflation rate for defense procurement is substantially higher than the overall inflation rate?

Answer. Unanticipated inflation has been a serious problem which has contributed significantly to rising unit costs for major Defense programs. Actual inflation rates computed by the Department of Commerce's Bureau of Economic Analysis show that inflation experienced in the purchase of major weapons systems commodities has occurred at higher rates (around 2 percent) than the GNP implicit price deflator which is normally used by OMB to budget outyear inflation. The impact of such unanticipated inflation has contributed heavily to program instability (the primary cause of Nunn Amendment threshold breaches) due to the full funding requirement policy for procurement programs.

Question. Salaries of production line workers, engineers, managers, etc., make up a very large percentage of the cost of procuring a weapons system. Salaries for many types of workers—auto, government, etc.—have been moderating significantly lately. What has been the situation with regard to salaries of defense workers, managers, and engineers in the private sector?

Answer. According to a Data Resource Incorporated Cost Forecasting Model, a simulation based on the January 1983 Five Year Defense Plan indicates that, using 1977 as a base year, the average hourly earnings for skilled workers—engineers and managers in the defense-related private sector are somewhat higher than the average hourly earning level for the durable goods sector and significantly higher than for the non-durable goods workers. Moreover, average hourly earning levels for workers in electronics, aircraft, ship building and other defense-related industries is increasing at a rate faster than for the average wage increases for durable and non-durable sectors. The data examined are based on current year dollar figures and do not account for the impact of inflation and taxation which moderate wage differences in terms of disposable income.

Question. Is the tremendous increase in defense expenditures causing a significant increase in salaries for skilled workers and engineers in the defense industry?

Answer. Increases in defense expenditures in combination with greater competition among defense industries and a finite number of trained engineers, skilled workers, and managers has contributed to significant increases in salaries in the defense-related private sector.

Question. What are the reporting requirements for the "Nunn Amendment" in terms of time frame? Are the cost overruns which exceed the parameters set in the "Nunn Amendment" to be reported quarterly or at the time they are determined?

Answer. Any time the program manager has "reasonable cause to believe" that either the Program Acquisition or Current Pro-

curement Unit Cost will increase by more than 15 percent over the March 31, 1981 SAR Current Estimate Value, he must immediately submit a report to the Service Secretary. If the Service Secretary determines that there is in fact a threshold breach, he must promptly notify Congress of the breach and must submit a report to Congress within 30 days of the determination date. If the unit cost breach is greater than 25 percent, the Secretary of Defense must report to Congress within 60 days of the original determination.

DUPLICATE TELEPHONE SYSTEMS

Question. In 1981, the Investigative Staff reported on telephone service provided by DoD, and compared it with service provided by the General Services Administration (GSA). GSA is charged with management of public utility services, including prescription of policy and methods of procurement.

GSA provides local and long distance telephone service to all Government users. DoD provides long distance service on its AUTOVON system. DoD is in the process of instituting consolidated local service in metropolitan areas.

Thus, the Government is operating *two* long distance systems, and *both* GSA and DoD will be in the business of providing local service in metropolitan areas.

DoD claims that with these two long distance systems "DoD and GSA are not offering competitive, but complementary systems." Please explain why a single common system will not save costs by allowing use of centralized attendant switchboards, and better utilization of long haul circuits?

Answer. Today the two telephone systems, AUTOVON and FTS are not duplicative and do not provide the same capabilities. The AUTOVON provides 24 hours a day, 7 days a week services to domestic and overseas users; the FTS is limited to domestic users with operator services during normal 5 days a week business hours. The AUTOVON is designed for survivability by selecting switch locations outside potential target areas. The switches are connected in a distributed the network configuration. The FTS nodes are in major metropolitan areas and connected in hierarchical scheme. Most of the AUTOVON interswitch trunks have Restoration Priorities (RP) assigned—only very few FTS trunks have RP's. Only AUTOVON is designed with the Multilevel Precedence and Preemption capabilities needed to support command and control DoD users, especially in times of stress and emergency. The AUTOVON is also being used for administrative and logistic traffic, which makes use of the extra system capacity necessary to enhance AUTOVON survivability. As the FTS service becomes more economical, the DoD is making greater use of it for administrative traffic.

In the future, as both the AUTOVON and the FTS evolve to a greater degree of commonality, there will be greater opportunity for system integration and economies of scale. Both the DSN and DMATS/GMATS concepts include such commonality and economy among their key goals.

Question. GSA and DoD have had in effect since 1980 an agreement to jointly study and implement consolidated telephone sys-

tems in metropolitan areas under single management. Please explain why the military services are continuing to provide independent local telephone service and to develop the new Defense Metropolitan Area Telephone Service (DMATS) in duplication of GSA's existing Federal Telecommunications System (FTS)?

Answer. The DoD and GSA are cooperating in identifying and implementing joint consolidated metropolitan telephone systems in which both DoD and GSA have significant telephone needs. For example, we have mutually selected Atlanta, Georgia, as the location for which a joint GMATS is being considered. On the other hand, Defense-oriented systems are being planned for locations in which Defense is almost the exclusive government user. The ability of these DMATS locations to accept civil agency subscribers is also being examined.

Question. DoD claims it is making increasing use of the FTS. Please explain why the Defense Communications Agency is independently developing the Defense Switched Network, a new long distance system?

Answer. Under the DSN program, we are defining alternative ways to satisfy future DoD telecommunication needs. The DSN program is taking full cognizance of plans and future developments of commercial and other government telephone capabilities and systems.

Question. DoD says it is the third largest user of the FTS. What percentage of total annual DoD costs for telephone service are incurred on FTS?

Answer. An exact answer to this question would require extensive compilation and examination of billing records maintained by different elements of the DoD. We were able to confirm from GSA that DoD is indeed the third largest subscriber to FTS (following Treasury and HHS) and our current annual billing is $35.6 miilion. This figure is for FTS inter-city services and does not include money spent for local FTS services.

Budget for Consultants, Studies and Analyses

Question. The fiscal year 1983 budget includes a total of $1.27 billion for consultants, studies and analyses. This is a $187 million increase over fiscal year 1982, and so represents a 17 percent growth. In an answer submitted for the record in February, DoD stated this increase "is related to the increases in price levels which the DoD provides for in its estimates as well as the requirements associated with the initiatives in the budget for improved military readiness and enhanced defense capabilities." Given the many concerns in the past over excessive use of consultants, and the abuses which have occurred, why is this request not going down, rather than up?

Answer. The request for these services has risen as a result of the increase in the defense budget to improve our national defense. In response to congressional concerns and direction from OMB, we have taken measures to improve management and control over the use of these support services. Among other matters, we are establishing in the Office of the Secretary of Defense a senior staff manager to oversee and monitor the use of such support service contracts by DoD Components.

Question. Please provide specific instances which domonstrate that these funds will improve readiness and enhance defense capabilities.

Answer. In the past, these funds have been used to improve readiness and enhance defense capabilities, and we expect that the increase in funds requested for these services in fiscal year 1983 will result in comparable kinds of improvements to those cited below using fiscal year 1981 and fiscal year 1982 funds:

In OSD: A study with politico-military defense implications—the US-Norway Bilaterial Study—initiated with contractor support in cooperation with Norway, was instrumental in leading to the US—Norwegian Memorandum of Understanding, signed in January 1981, for the prepositioning of a US Marine Amphibious Brigade's equipment in Norway to enhance US rapid ground reinforcements and Norwegian defenses, particularly in the North.

A $110K study of the Unit Status and Identify Report (UNITREP) Data System—Improved Application for Crisis Management investigated methods to improve the utility and currency of information available through the UNITREP data base. This study resulted in a 70 percent reduction in processing time (from 24 hours to 7 hours) required to make UNITREP data available to decision-makers. While the success of this study cannot be measured in terms of dollar savings, in a crisis situation where time and information are critical to the management of that crisis, the value of the reduction in processing time was immeasurable.

The Army's Tactical Command Readiness Program—Cycle V supports the enhancement of professional competence of senior Army commanders and staff by providing an instructional vehicle for:

Testing competing strategies for War Plans and Operations;

Resolving staff relationships prior to major field exercises;

Providing an environment for exercising wartime command and staff procedures.

The program is designed to keep senior tactical commanders (colonel and above) abreast of major operational considerations in the development and tactical employment of a major Army and supporting forces in both contingency and general war situations.

A second example is the Army Mobilization Base Requirements Model (MOBREM) that will result in a data base that will size, by location and time period, all workload demands placed on the CONUS base during mobilization and what base in CONUS is required to support mobilization, training, deployment, and sustainability of the total Army during full mobilization.

Question. What new steps have you taken to ensure that procurement of consultants and similar services is fully justified and is being made at the lowest possible cost?

Answer. The DoD has reduced its reliance on outside contract services by transferring some efforts to in-house personnel, eliminating marginal/duplicative efforts, and by increasing review of contracts prior to award to eliminate possibilities of waste or abuse. The Department has instituted stringent controls designed to limit the use of contractual support and validate the requirements when such support is appropriate. These controls include greater levels of review and increased use of competitive procurement. A Senior Ex-

ecutive Service position has been specifically established to provide for overall management improvement of Consultant, Studies Management Support and Related Services. That official will seek improvements in policies and management of these types of efforts to insure that the initiatives discussed above will be further enhanced. On June 8, 1981, the Deputy Secretary of Defense wrote to all DoD Components recommending a series of remedial actions to improve the management of contract services, including studies, and requested that each DoD Component outline how they planned to control these services. The Components' responses were positive, supportive, and constructive. They included appointing oversight managers for these services, higher level approving authority for these services, establishing a contract review process for requirements, and reacquainting all personnel with policy guidance related to the procurement of and controls over these services.

Question. Is this fiscal year 1983 request with those steps?

Answer. Yes. The fiscal year 1983 request reflects savings anticipated from steps taken to tighten the management and reduce the requirements for these services and, at the same time, support the various programs that require these services.

Question. Why is Navy so much more dependent on consultants and outside managers than everyone else in DOD?

Answer. Of all the Armed Services, the Navy is the most complex in terms of weapon systems supported. It has air, surface, subsurface and land forces which depend on highly sophisticated weapon systems to perform their missions. Satisfying these divergent technical and engineering needs is complicated by: (1) the intermittent nature or specialty of these services; and (2) the lack of adequate in-house civilian manpower authority for long-term continuing functions. Therefore, Navy by design uses contractual services as a matter of good management for intermittent needs and because Navy has no other choice for longterm needs but to rely on contractors to provide the required level of professional and technical assistance to develop, acquire and support Navy weapon systems. The Navy consciously does not contract out its proprietory management functions.

Question. Why is the Navy requesting a 22 percent increase in this category over last years.

Answer. The 22 percent increase in fiscal year 1983 requirements includes an overall 7 percent increase for inflation or cost growth. The remaining 15 percent is primarily related to expanding Navy production of weapons systems and the increased technical complexity of Naval forces. The largest percentage increases occur in procurement appropriations directly supporting ship, aviation and missile weapons systems. In the SCN appropriation, for example, an increase of $34 million (120 percent) in contract support is driven by a growth in total shipbuilding from $8.9 billion in fiscal year 1982 to $18.6 billion in fiscal year 1983. An APN increase of 48 percent is directly related to expanded services for AV-8B, F-18, SH-60B and other aircraft in the initial stages of production.

Operations and Maintenance Navy contract service requirements increase by 16 percent. About half of this increase is in the Contract Engineering Technical Services category and includes direct support to Fleet Air Type Commanders. Services provided in avi-

ation are in on-the-job and classroom training and in providing a technical communication channel from the manufacturer to the Navy user activity on technical problems. Further increases are required in Systems Engineering for support of submarine extended operating cycles, logistics support of ship deployment and provision and maintenance of ship life cycle documentation. An increase of $5.1 million will reinstate national television and increase radio advertising for enlisted recruits aimed at the 17–21 year old male market. As a general consideration, increases for contract services in all Navy appropriations are basically driven by acquisition and force expansion both quantitatively and qualitatively/technologically. This expanded weapon system capability is being accomplished with a civilian workforce which has been relatively stable or decreasing, necessitating growth in contractual or private sector services.

Question. How do you justify the 120 percent increase in Professional Managements services in the Shipbuilding appropriation? What will this buy us?

Answer. Information regarding the overall 22 percent increase for Navy was provided in the previous question and answer. Information regarding the 120 percent increase in the Shipbuilding appropriation follows:

According to the information provided to the Congress in support of the fiscal year 1983 request for Navy Shipbuilding (SCN), Professional Management and Services by Contract increased from $28.6M in fiscal year 1982 to $63.0M in fiscal year 1983. This is a 120 percent increase in the shipbuilding appropriation.

In the President's budget request for fiscal year 1983, $18.648 billion has been requested for Navy shipbuilding, an increase of 109 percent over the $8.902 billion appropriated for this purpose in fiscal year 1982. Strong support is necessary to assist the Navy, with its limited manpower, to build these complex ships. Design integration and integration of numerous systems to ensure they function together properly are two primary problems which must be solved. The increase in Professional Management and Services by Contract is not inconsistent with this growth in the total program.

The $63 million requested will provide the services described below for the four to ten years required to construct the 25 ships in the fiscal year 1983 request.

1. *Logistics Support Services*—Service in connection with the development, support, and implementation of Integrated Logistics Support (ILS).

Examples: Maintenance Support Plan and Provisioning Requirements.

2. *Program/Project Management Support*—Services covering a wide variety of technical and managerial support services.

Examples: Program Planning and Program Review and Analysis.

3. *System Engineering*—Services to investigate, evaluate, or assess technical, scientific, or engineering problems, concepts, and performances of hardware.

Examples: System Performance Reviews and Evaluation of Engineering Change Proposal.

4. *Specification Development*—Services to provide hardware or software specifications, including efforts providing configuration management.

Examples: Drafting Technical Specifications and Production Configuration Data Analysis

5. *Technical Data Collection*—Services which include the collection or organization of data.

Examples: Technical Evaluation and Simulation and Modeling of Product Performance.

6. *Techology Sharing and Utilization*—Services to examine alternate applications and adaptations of existing or developing technologies.

Examples: Evaluation of strategies for Production Processes and Evaluation of Alternative Material Combinations.

7. *Policy/Program Review and Development*—Services to investigate, evaluate or assess existing managerial policies/organizations, or to develop alternate procedures, organizations, and policies.

8. *Other Professional, Management Services*—Support services which are not identifiable to any category above.

Question. Why is it necessary to provide more than one year money for consultant studies and analyses and management support contracts?

Answer. Certain types of service contracts are integral to the production of hardware and its delivery to the operating forces. In order to give visibility to all costs of acquisition, these service contracts are normally budgeted in the procurement line item and all requirements for services arising from the acquisition of a specific end-item unit are included in the budget for that unit in the year that funds are requested for the end item. Following are some examples of services budgeted as intergral to hardware acquisition: Production Engineering; Quality Assurance; Product Improvement (Within Performanace Envelope); Acceptance Test and Evaluation; Integrated Logistic Support Planning; and Training Planning.

OBLIGATION OF MANAGEMENT SUPPORT CONTRACT FUNDING

Question. Provide for both Professional Management Services and Contract Engineering Technical Services an individual breakout for SCN, APN, WPN, and OPN for fiscal year 1979–82 showing the amounts unobligated at the end of each year including to date figures for fiscal year 1982.

Answer. Data on the amounts unobligated at the end of prior fiscal years for the Navy's procurement appropriations is not available since the majority of obligations for these services were posted as an integral part of the parent end-item line and are not distinguishable within the Navy accounting system. Estimated status of unobligated balances for fiscal year 1982 as of 30 June 1982 has been developed from current management data and is provided in the following table.

PROFESSIONAL MANAGEMENT SERVICES (AS OF 30 JUNE 1982)

[Dollars in thousands]

Appropriation	Amount budgeted	Amount unobligated
SCN	$28,565	$4,779
APN	22,917	17,389
WPN	12,211	5,861
OPN	3,253	1,301

CONTRACT ENGINEERING TECHNICAL SERVICES (AS OF 30 JUNE 1982)

[Dollars in thousands]

Appropriation	Amount budgeted	Amount unobligated
SCN	$6,230	$1,042
APN	400	210
WPN	600	600
OPN	94	38

ECONOMIES AND EFFICIENCIES RECOMMENDED BY GAO

Question. Last year, GAO recommended 15 major areas where large sums of money could be saved in the Defense budget. You testified that you would review these recommendations and report back to Congress. Secretary Weinberger has stated that several of the GAO suggestions have been incorporated into the fiscal year 1983 request. Specifically, what were those suggestions, and their associated dollar value?

Answer. Several of the GAO suggestions have been or will soon be implemented and are reflected in the fiscal year 1983 budget request. Among these are suggestions to;

Complete the consolidation of management of consumable items . . . The Deputy Secretary of Defense announced a decision to transfer wholesale inventory management responsibility for 200,000 consumable items to DLA by the first of calendar year 1982. The impact of this transfer has been incorporated in the fiscal year 1983 budget. It is estimated that this transfer will generate annual recurring savings of approximately $15 million.

Traffic management activities should be further integrated . . . The Deputy Secretary of Defense, on September 16, 1981, approved a JCS concept for consolidations of the Military Sealift Command (MSC) and the Military Traffic Management Command (MTMC). A timetable of action leading to consolidation by October 1, 1982 was established. Annual savings of approximately $10 million are expected from this consolidation.

Multiyear contracting is an idea whose time has come . . . The fiscal year 1983 budget contains 18 major multiyear contracting programs. Cumulative fiscal year 1983 savings are estimated to be approximately $25 million. Savings in the outyears are considerably higher. In addition the Services are intensively reviewing their acquisition programs for additional multiyear contracting candidates.

BEST DOCUMENT AVAILABLE

Lower cost alternatives should be examined before the Secretary of Defense and the Congress approve new items. Based on the March 29, 1982 economies and efficiencies report it is estimated that the fiscal year 1983 budget contains approximately $88 million in savings associated with lower cost alternatives. The savings in the outyears are again significantly higher, amounting to approximately $1.1 billion for fiscal year 1983–87.

The Department of Defense has reviewed in detail the GAO suggestions and where practical has implemented them. Secretary Weinberger in a letter to the Comptroller General, Charles A. Bowsher, dated December 2, 1981, reported on DoD's position and planned actions with regard to each of the 15 areas.

ECONOMIES AND EFFICIENCIES RECOMMENDED BY COMMITTEE

Question. Last year, this Committee advised you that the Committee's report for fiscal year 1981 offered recommendations that could amount to considerable savings in Defense dollars. Secretary Weinberger's response stated, "The majority of the items disussed are not actions which can be addressed as specific budget decisions. Where it was possible, we have included these actions as part of our economies and efficiencies package."

What Committee actions were part of your economies and efficiencies package?

Answer. Many of the Committee's recommendations are embodied in whole or in part in recent DoD economies and efficiencies initiatives. For example, the Committee suggested that an opportunity to save was being lost by a failure to consolidate base maintenance activities. The March 29, 1982 economies and efficiencies report contains 14 individual initiatives in the areas of Base Realignments and Base Support Consolidations/Reductions. The Committee also suggested that savings were being lost by a failure to award contracts for computers based upon total lowest cost to the government. The economies and efficiencies report contains a number of specific management initiatives that have generated significant savings in the acquisition of computer resources and services.

In another area the Committee suggested that savings were also being foregone by not consolidating Supply Depot Activities when such consolidation have been found feasible. The economies and efficiencies report contains 13 management initiatives in the area of Logistics Improvements alone. The above examples are indicitive of the extent to which items covered by the Committee suggestion are included in the economies and efficiencies package.

Question. Explain why these recommendations cannot be addressed by budget decisions?

Answer. The majority of these actions cannot be addressed by specific budget decisions. A couple of examples will highlight the problem. One of the Committee's suggestions is to reduce the theft/misappropriation of supplies and materials. A suggestion the Department of Defense fully agrees with and is actively committed to achieving. However, there is no line item or budget category whereby direct budget action could be taken to reflect this commitment. Likewise the suggestion that savings are being lost through

repeatedly paying outrageous prices for small, simple to manufacture items cannot be translated into a direct budget line item or category. Since the majority of the Committee's suggestions are similar to the above examples it should be readily apparent that while DoD agrees with and supports most of the suggestions they cannot be addressed by specific budget decisions. They are being addressed in our continuing commitment to achieving economies and efficiencies in the management of Defense resources through improved management initiatives.

Question. When Chairman Whitten forwarded our S&I staff reports on procurement policies, did you merely send the specific section to the various Departments, or did OSD conduct a thorough analysis of these issues?

Answer. In no instance were the S&I reports merely forwarded to the Services and Defense agencies without examination by OSD. The Services and Defense agencies were provided copies and given an opportunity to respond. These responses were subsequently examined by various OSD elements.

Question. If so, what actions did you take?

Answer. The Services and Defense agencies were provided an opportunity to respond to the issues raised by the S&I staff. Additionally, the issues and Service responses were examined by various elements of OSD. In some cases, action on the issues was accomplished or commenced prior to receipt of the formal S&I report as a result of interaction between the Services and the S&I staff. Just an example of this was the Army and Air Force efforts to improve management of their conventional ammunition programs (Report No. 3, February 1982, Volume I, Part IV). In other instances, action was taken at the OSD level. An example of this was the emphasis of the need to take action on contract audit recommendations by issuance of DoD Directive 5000.42 (Report No. 2, September 1981, Volume II, Part III).

[CLERK'S NOTE.—End of questions submitted by Mr. Addabbo.]

Mr. ADDABBO. The committee stands in recess until 9:30 tomorrow morning.

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